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JOURNEY ROUND SIAM.*

By J. S. Black, First Assistant of Her Majesty's Consular Service in Siam.

Within recent times the importance and magnitude of British interests in Siam have been, by the course of events in that country, brought prominently before the public. These interests arise from the presence of large numbers of British subjects and the investment of British capital in the various industries of the country. Our subjects are not only English people, but Indians, Malays, Burmese, and Chinese; in fact, every species of Asiatic who can lay claim to have been born in British possessions, and they are to be found not only at Bangkok, the capital of Siam, but are scattered in thousands throughout the most distant parts of the kingdom. The great proportion of this foreign population is composed of Burmese or Shans, who migrate from their homes into the adjoining Siamese territory as traders or gem-diggers. By virtue of the existing treaties with Siam, all her Majesty's Asiatic subjects are entitled to Consular protection and assistance, and the object of the journey which forms the subject-matter of the paper to-night was to hold district courts, settle a number of long-pending disputes between British subjects and Siamese in the provinces, and generally acquire information regarding the nature of British interests in these little-known regions.

I shall not in this paper allude to the details of my official business, but I may be permitted here to remark that I was occasionally extremely busy, and, after a hard day's work as Consular Court Judge (the Court sometimes consisting of a tent and the bench of a small camp table), I did not feel much inclined to worry the natives in search of that precise and scientific information which one ought to be able to

* Paper read at the Royal Geographical Society, April 27, 1896. Map, p. 540.

present to such a learned body as the Royal Geographical Society. My journey was official, and naturally the greatest part of my attention was devoted to my official business, and, being versed neither in geology, zoology, nor any other "ology," I must crave the indulgence of this Society for venturing to lay before them such facts as would come under the observation of an ordinary traveller. The course of my journey, however, lay through some districts which have not to my knowledge yet been described, at least from the point of view from which I propose to treat them to-night, and geographical, as well as public, curiosity about these districts has been considerably heightened within the last few months. I might add that, having resided seven years in Bangkok, and devoted a large share of that time to the study of the Siamese language, I was in a position to communicate freely with the natives and obtain information at first hand; and thus I might say, with all modesty, I possessed an advantage, emphasized as it was by my official position, that is given to few travellers in a strange country.

Siam, as will be observed from the map, is, geographically speaking, roughly divided into two great basins—the basin of the Menam, and the basin of the Mekong. The course of my journey struck eastwards from Bangkok to the Talesap Lake, northwards through the western side of the Mekong basin, and, crossing the watershed south of Luang Prabang, I cut across the rough and hilly country of Northern Siam to Chiengmai, whence I descended the rivers Meping and Menam, a distance of nearly 600 miles, to Bangkok again. It is not possible, within the brief limits of such a lecture as this, to enter into the details of a journey which lasted six months, and during which I traversed over 2000 miles. I can, therefore, endeavour merely to describe new districts as concisely as possible, and treat generally of a few salient features such as might be imagined to be of interest to those who desire to add to their knowledge of this country.

Chantabun, which is situated 14 miles from the mouth of a stream of the same name, and lies 188 miles from Bangkok, was my first stopping-place—a place which has of late years been honoured with an amount of public attention which its intrinsic merits would not by any means have attracted to itself. It is generally spoken of as the second port of Siam, but it is a port in which only a few miserable canoes can be seen at any time, except on the one day of the week when a small Siamese steamer calls from Bangkok. Nor is its population considerable, for, on the authority of the Governor, that amounts to four thousand only, of whom at least one quarter are the descendants of Annamites who some generations ago migrated from their homes in Cochin-China. The whole province does not contain a population of more than thirty thousand, and this is concentrated on the Chantabun stream and near the coast. The Annamites, as well as many Chinamen, who are numerous in the province, are converts to the Roman Catholic faith, and their spiritual wants are

ministered to by a French missionary, assisted by several native pastors. The exports are insignificant in value, with the exception of pepper, which amounts to about £60,000 per annum. The pepper plant, the sight of which reminds one of the hop gardens of Kent, flourishes at the base of the Sabap hills, and is cultivated exclusively by Chinese. These industrious individuals have, as usual, the monopoly of all lucrative business in their hands, keep the best shops, and control the liquor and opium trade.

Chantabun is on the way to the sapphire and ruby mines, which are situated in the adjoining provinces of Battambong and Krat, and a

CHANTABUN.

number of Burmese reside here for the purpose of buying the precious stones from the diggers, and of trading in the necessaries of food and clothing required at the mines. These mines contain a population of over two thousand Burmese-British subjects, and here lay the chief scene of my official labours in this part of the country.

I might add, by the way, before leaving Chantabun, that the presence of the few French troops just outside the town have not produced any noticeable difference in the place, except that the price of chickens and eggs has been slightly enhanced—a fact which the old Burman in whose house I lodged was careful to communicate to me. The civil government is entirely in the hands of the Siamese authorities, and trade and business go on as usual.

The province of Chantabun is separated from the province of Battambong by a range of hills from 2000 to 3000 feet high, and one

peak—Sai Dao—is passed on the route which, judging roughly, must be 5000 feet high. It will thus be observed that Chantabun is not, as has sometimes been erroneously supposed, the port and outlet of the provinces of Battambong and Siamrap. These provinces drain into the Talesap Lake, and finally into the Mekong, whilst the province of Chantabun drains into the Gulf of Siam. Indeed, there would be little or no communication between the two places were it not for the fact that the sapphire mines are situated near the frontier of Chantabun.

Pailin is the name given to that place, and the journey thither, which is done by pack-bullock or elephant, occupies about four days. The narrow footpath—impassable for bullock-carts—winds its way through dense forest, and rises to a height of about 1000 feet. Though the scenery is rugged and varied, it is not nearly so impressive and picturesque as what I was yet to see amongst the wild and solitary grandeur of the Mekong gorges or the rapids on the Menam. At Pailin my duties detained me twelve days, and then I passed on to Battambong.

Battambong and Siamrap are provinces which have somehow gained the reputation of being extremely rich, fertile, and populous. In recent times these provinces have hardly ever been referred to except in euphuistic language describing their wealth, population, and magnificence. As no Consular official had ever been in this direction before, I was naturally anxious to explore this unusual land flowing with milk and honey, and scrutinize, if necessary, these vague and glowing accounts in the light of cold and relentless statistics. I must confess that any sanguine expectations I possessed were considerably shattered after I had traversed the province, seen Battambong the capital, and succeeded in getting a few figures about trade and population. It does not strike one at all as the richest and most populous province of Siam. In fact, in its present condition, it by no means comes up to the general standard of wealth of the Menam valley.

I do not speak of the potentialities of the place—far from it—as almost every part of Indo-China is capable of enormous development under proper European management, but I take things as they now stand. And what do we find? The population of the combined provinces of Battambong and Siamrap I estimate at about eighty thousand, and the import and export trades combined may be valued at about £80,000 per annum. I must state that these figures are only approximations, as *boná fide* statistics are not to be obtained in any part of Indo-China, and the data upon which even the most painstaking inquirer bases his results are necessarily very imperfect. My figures of trade were obtained from individual merchants and from calculations based on the amount of taxes, and population from rough guesses at the number of able-bodied men in the different subdivisions. In any case, the statistics are accurate enough to show that the terms of "rich, fertile, and populous" are hardly applicable to this part of Siam.

The town of Battambong itself is a scattered village of about four thousand inhabitants lying on both sides of the Sangkai stream, which, when I was there during the dry season, did not contain enough water to float an ordinary boat. Three miles beyond the town the cultivation of rice ceases, and nothing is to be seen but a vast expanse of treeless, grassy plain stretching out to the jungle which fringes the distant horizon.

The imports are chiefly cotton cloth for the clothing of the population, and small quantities of other articles, such as lamps, slippers, silks, looking-glasses, brass dishes, etc. The principal export is rice, and this

ON THE WAY TO THE GREAT LAKE, EAST SIAM.

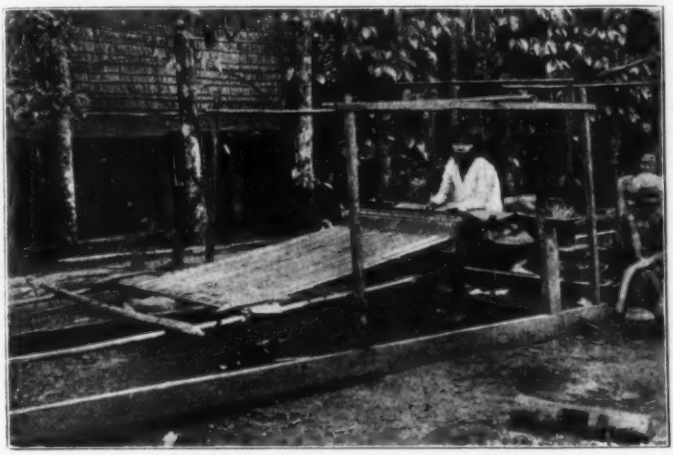
amounts to about £20,000 per annum, and fish to about £15,000. The other exports are hides and horns, cardamums, mats, etc. The Siamese share of the fisheries of the lake is quite insignificant compared with that of Cambodia.

It is gratifying to learn that, in spite of the close connection which exists geographically between Battambong and Saigon, the cloth trade here is almost exclusively British, and is in the hands of two wholesale British Indian dealers. It is an extraordinary fact that British goods can be conveyed to Battambong overland from Bangkok, a long and toilsome journey of two days by steamer and about twenty days by bullock-cart, and yet undersell French goods in Battambong, though the latter can in the rainy season be brought up by steamer from Saigon in two days. In this season the Indian traders often get their cloth through Saigon by paying a heavy transit duty. The bulk of the exports naturally find their way to Saigon, but French imports are insignificant, and consist chiefly of liqueurs and brandy, silk goods, and knickknacks.

A rich spot, however, in this province is at the sapphire mines situated up amongst the hills at the sources of the Khonburi stream. It is a curious geological circumstance that a range of hills forms a distinct line of demarcation between the sapphire mines at Pailin and the ruby mines at Nawong, in the province of Krat. Sapphires are found on the northern slope of these hills, and rubies on the southern. The mines are of two kinds, surface and deep. The former are 2 or 3 feet deep, or, in fact, sometimes the surface of the ground is merely scraped with a piece of iron or stick, carefully powdered to bits with the hand, and stones picked out. The other mines are from 15 to 20 feet deep, and have generally an aperture of 4½ feet square. The upper stratum of earth is loam, then loamy and clayey, and finally the ruby or sapphire layer is reached with a thickness varying from 4 to 18 inches. This layer is hoisted up with a rude crane and basket, and carried down to the nearest stream, where it is washed and carefully examined in little flat baskets with closely woven meshes. From the waterworn appearance of the fragments of rocks embedded in the layer, it would seem that the precious stones are not found in the original matrix, but have been washed down from the hills. A British company was formed some years ago to work the ruby mines, but, as the Burmese miners resented the right of the company of insisting upon all the stones being handed over at a price fixed by the company's expert, they left the mines in large numbers. No other class of men can be found to work in these pestilential and malarious jungles, and thus the production of stones and the existence of the company gradually came to an end. In 1895 another British company, the Siam Exploring Co., Ltd., received from the King of Siam the exclusive right of working the sapphire mines at Pailin, and they also bought up the rights of the former company at the ruby mines. The entire mining-field is thus in their hands, and there is no doubt but that it is a most valuable concession, as the annual output of stones from this region is very large. The mining district at Pailin covers an area of 6 miles long by 1½ miles in breadth, and large portions of this are still untouched, and are doubtless gem-bearing. Immense quantities of cheap stones are found, but some of the Siam sapphires are as good as any that are brought into the market. The rubies do not bear so good a reputation. They are nearly all tinged with a dark "clarety" colour instead of that clear pigeon-blood hue so prized in this valuable stone. The difficulty that the company has to overcome—and it is by no means a small difficulty—is to get hold of the stones. In such an extensive area supervision of the miners is almost impossible, and, besides, the Shans, who up to the present have been working each man for himself, will not labour for wages, nor will they naturally give up good stones when they find them.

While at Battambong, the governor, who is a frank, genial young

man, and whose acquaintance I had already made in Bangkok, planned a deer-hunt for my distraction. Deer are hunted here in an extraordinary and, I should think, quite a unique fashion. They are, in fact, run down by ponies, and that in a remarkably short space of time. The ponies are small, hardy, and very active animals, as one may judge from their success in this hunt. The entertainment was got up in grand style, with twenty elephants and thirty ponies, and the ponies were ranged across the plain outside Battambong in a line extending about a quarter of a mile, whilst the elephants followed up behind with spectators. The deer, which are by no means small animals, but the ordinary *sambur* of these tropical countries, swarm in



A CAMBODIAN GIRL WEAVING CLOTH.

great numbers amongst the thick deep grass, and as soon as the head and horns of one was seen bobbing up and down as it bounded away like an arrow, the nearest half-dozen ponies started off after it at a break-neck pace. The natives ride barebacked, and, as the ground is full of depressions and empty water-holes, it is marvellous how well they retain their seats.

In three or four minutes' time we saw from our elevated perch the foremost rider stop and jump off. When the elephants came up, the deer was already nearly skinned, and a few moments afterwards it was cut in two, tied together with its own skin, and slung across the back of an elephant, there in readiness to carry home the spoil. The deer, it seems, drop down breathless, and the rider gives it the *coup de grâce* with his hunting-knife. I calculated the course of two of these runs, and put it down at three-quarters of a mile for the one and three miles

for the other. The spirited little ponies appear to enjoy the fun with as much zest as the men themselves, and one animal, whose rider was sent flying headlong into the grass, enthusiastically galloped riderless in to the death. The hunt lasted from nine in the morning till three in the afternoon, and in that time we caught four deer, and seven or eight escaped, either by superior speed or due to the fact that the ponies did not get the sight of them in time.

Battambong and Siamrap are provinces of the ancient kingdom of Cambodia, which, after centuries of struggle with Siam, varied with internal dissension, finally came under the suzerainty of the latter power towards the end of the seventeenth century. In 1867 France assumed a protectorate over the lower half of this tributary kingdom, and the possession of the remaining portion, Battambong and Siamrap, was by a Franco-Siamese treaty assured to Siam. The current speech of the country is Cambodian—a language which differs radically from Siamese—but Siamese is the official language, and all the officials, who are, one might say, both the aristocracy and the plutocracy of these Asiatic countries, speak both languages with equal facility. The present descendants of the once powerful Kmer race have, in their customs, religion, and general characteristics, much in common with the Siamese; but they are inferior to them both in physique, intellect, and morals. They are, indeed, notorious both for mendacity and petty pilfering.

From Battambong I descended the river Sangkai, crossed the Talesap Lake in three and a half hours, and proceeded to Siamrap, which lies about 10 miles from the shore. This great sea of fresh water, which measures nearly 100 miles in length and 20 at its greatest breadth, rises no less than 21 feet during the rainy season, and floods all the adjoining country for miles. In the dry season it is not more than 4 or 5 feet deep, and it is at this time, during the months of March, April, and May, that the surrounding population flock to its shores to catch the numerous fish.

Siamrap is itself a stagnant little place of about two thousand inhabitants; but the pretty rivulet here of pure sparkling water, with its old-fashioned water-wheels and its banks shaded by the wavy palm and cocoanut tree, forms a refreshing scene after passing through the low and swampy country that fringes the Talesap Lake.

I only stayed a day and a half in Siamrap, as my time was exceedingly limited, and as the only case I had to investigate was a trifling one of bullock theft, which I settled with the governor in about three minutes. The celebrated ruins of Angkor Wat and Angkor Thom lie about 4 miles from the village, but I do not intend to launch out into any disquisition on a subject which is now well worn. I might remark, however, that though I am not an enthusiast by any means about ruins, and particularly ruins of Indo-Chinese temples, of which we get rather

tired out there, even the most casual spectator cannot fail to be overwhelmed with admiration and amazement as he gazes upon these wonderful galleries, pretty side buildings, and lofty sculptured towers rising up before him in silent grandeur and magnificence. It is a solitary and desolate spot, and nothing is to be heard but the gentle sighing of the wind as it rustles the leaves of the melancholy palm trees, or whistles along the deserted corridors, now damp with age and infested with swarms of ghost-like bats. All round and in the centre of the ruined city itself grows dense and lofty jungle, and one can well imagine the beasts of the field holding high carnival amongst the fallen and broken pillars when the clear moon looks down upon these ancient monuments of human greatness. The imagination pictures to itself, too, the time when Angkor Thom, the city, was the capital of a powerful empire, and Angkor Wat the holy shrine and temple of the dense and busy population that once trod these jungle-covered plains; and now, though empire and race have long since disappeared almost without leaving a trace of their history, the immense blocks of stone which the hands of these people dragged here and piled high one upon another, the highways radiating from the capital, the stone bridges and distant scattered monuments, still remain to attest the former might and opulence of the country.

Before hurrying onwards, however, I inquired about the traditions lingering among the present inhabitants, and at my request the Governor ordered forth one of the oldest inhabitants of the place—a patriarch of seventy-five, who was represented to be the best repository of this vague traditional knowledge. As he squatted humbly on the ground before me, I regarded this curiosity with considerable interest, and enjoined him in judicial language to "tell the truth, the whole truth, and nothing but the truth." This is what he said, as I took it down word for word—

"There was once a king of Angkor Thom, Chao Pratum Suriwong by name, and he had a son Pra Ketmala. Pra In came down from heaven and saw Pra Ketmala. He asked Chao Pratum Suriwong that Pra Ketmala might be taken up to heaven. He was taken up to heaven, but the smell of the Thewada (angels) being too strong for him to bear, he returned to Earth again, and then Pra In ordered Pra Weesanukam to build Nakon Wat. Pra Weesanukam accordingly came down and told Chao Pratum Suriwong to build the temple, and Chao Pratum Suriwong impressed men to do the work. Men to seven times the number that could stand within the walls of Angkor Thom were impressed, and they completed the whole building in seven days. When the building was finished, Pra Ketmala did not stay in it himself, but placed therein Pra Putta Kosa Chan, who had been a priest in Ceylon. Then Pra Ketmala went to Beng Melia, near Pnompenh."

Mythology is not a strong point with me, and besides there is no

time to construct ingenious theories from this little statement, but I put it on record, and perhaps the learned in these matters may find that it forms at least a condensed version of the already received notions about the construction and object of these wonderful structures.

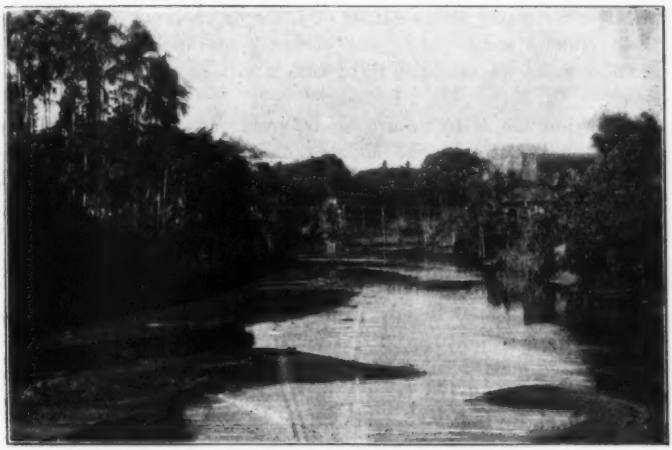
The next portion of my journey lay through the western side of the Mekong basin, with the town of Korat as a halfway resting-place. Bullock-cart is the method of locomotion in this district, and as these crazy vehicles are dragged along at a pace of about 1½ mile an hour, an ordinary day's march is a long and toilsome business. It was now the month of March, and the heat was becoming oppressive—so much so that I found it necessary, in order to get any progress at all out of the bullocks, to make my caravan travel during the coolness of the night, and rest, if possible, in some shady spot during the day. Our usual marching hours were from three in the morning till eight or nine, and then again from three in the afternoon till eight, and the average number of miles covered in that time was only about 15 or 16. I rode a pony myself, and a very small animal he was—so diminutive, in fact, that I could barely keep my feet off the ground; but he was a hardy little beast, and gallantly carried me all the way between Siamrap and Nongkhai, on the Mekong, a distance of nearly 500 miles. I sold him then for 30*s*., but as he only cost £2 originally, it could not be called an expensive ride, particularly as he ate nothing but burnt-up grass and a little rice.

The character of the country throughout the whole of this region is much alike, and becomes to the traveller exceedingly tiring and monotonous. The trail, as one may call it—for there is no pretence at road-making—winds through open jungle, the trees being about 30 feet high, and mostly mai rang, mai teng, and mai yang, as they are called in Siamese—resinous trees of the *Dipterocarpus* genus. The landscape is flat, with the exception of the rise up to the Korat plateau, and there the highest average level above the sea is about 800 feet, with a very gentle dip in an easterly direction towards the Mekong. The population, which is Cambodian up to and somewhat beyond Dong Rek hills and Lao north of that, is exceedingly scanty. In the neighbourhood of Dong Rek hills are found a race called Suey, who speak their own peculiar dialect in addition to Cambodian or Lao. They would appear to be the remnants of aboriginal tribes, and are, if anything, uglier, dirtier, and more primitive-looking than the surrounding Cambodians and Lao. The Korat people, who are also an ugly but sturdy race, seem to be a hybrid of Lao and the aboriginal Suey; but, from the neighbourhood of Cambodian settlements in this district, there is every probability that the limit of the ancient Kmer kingdom extended right up to Korat.

In and around the town of Korat, however, Siamese is the prevailing language, and the "panung," or Siamese loin-cloth, which is drawn

between the legs in the shape of trousers, is the usual dress of both sexes. The difference in the dress of the Lao is that the women wear a brightly striped petticoat instead of the "panung." The silk-worm is extensively cultivated, and the natives are skilful in manufacturing beautiful silks, some kinds of which bear a striking resemblance to Scotch tartans. They weave most of their own clothing, which consists only of this loin-cloth and a breast-scarf.

The whole of the Mekong region beyond 50 miles north and east of Korat is peopled by these Lao, a race who are as much akin almost to our own Shans as to the Siamese. The language differs both in character and sound from Siamese; but, as the Lao country has been under



SIAMRAP DURING THE DRY SEASON.

the domination of Siam now for a hundred and twenty years, Siamese is widely understood and spoken.

This extensive tract of country suffers from two great and serious evils—the want of inhabitants and isolation. The want of population may be exemplified by one fact, namely, that the largest town in the whole of the Mekong valley from Pnompenh to Luang Prabang is Nongkhai, and that place, as I was careful to ascertain, contains between 700 and 800 houses, or say a population—to be liberal in calculation—of about 5000. In Ubon there are 632 houses, and Korat is, I should think, somewhat larger. These three towns constitute the great centres of population in the whole of this immense territory. For days and weeks almost, even on the main routes of communication, a traveller will pass villages which number only a few squalid huts, and when I came to a place of two hundred huts it was thought a great event by all

my men, for in a metropolis of that size there was some kind of market where they might replenish the camp larder.

Why the population should be so scarce is difficult to say. In olden times war and bloodshed certainly ravaged the country; but now, from my own observation, I should think the principal check on the growth of population is pestilence. The year of 1895 may have been exceptional, but everywhere I went I saw signs of widespread epidemics of fever, small-pox, and cholera. In and around Korat and some other places this was particularly noticeable, as the people have the custom of sticking up in front of a house where there is illness, a little earthenware pot marked with blue or white bands. This was not done out of consideration, it seems, for the neighbours, but was a visible token of supplication for mercy to the demon of fever or cholera. The number of these pots in some places was perfectly alarming, and on more than one occasion we marched right into a village where cholera was rampant.

This region, too, is by nature cut off from communication with the outside world. Outlet by the Mekong on the east is barred by the precipitous rapids at Khone (or Khawn, as it is locally pronounced), and what trade there is has always tended in the direction of Korat. The route from Korat to Bangkok, again, is extremely difficult and dangerous, as it passes through a dense and dark forest, which has such a frightful reputation for fever that the name is always mentioned by the Siamese with bated breath—and with good reason too, for it is beyond doubt a most pestilential and malarious spot. The narrow and tortuous trail can only be traversed by pack-bullocks, and they take ten days to accomplish the journey to Saraburi, which is within three days of Bangkok by boat.

It is by this route that trade is carried on, and, considering the difficulties and cost of transport, it is rather surprising to find that there is any trade at all. Not that it amounts to very much, for, judging roughly in the absence of any reliable statistics, I should not be inclined to estimate the total import and export trade at more than £200,000 per annum. The imports consist, as usual, principally of cotton cloth and a few other articles of clothing, brass dishes and crockery, and the exports of cardamums, raw silk, gum benjamin, cattle, and hides. On account of this isolation, the inhabitants do not seem to possess that instinct for trade which renders a country valuable. They grow their own rice and tobacco, weave their own clothes of silk and cotton, and in many places have not even got beyond a system of barter for their few wants, and of paying their taxes in kind.

Korat is important in one sense, as being the depôt for the whole of the Hinterland, extending even across to the left bank of the Mekong, but it cannot be said that this is a region which, in its present

condition, offers much attraction to a foreign market. Easy and cheap communication by railway would doubtless create a much larger demand for foreign commodities, but that will be naturally limited by the scarcity of population. Even judging liberally from the data which I accumulated on this journey, I do not think that the total population of the whole of the Mekong basin still remaining in the possession of Siam can, at the utmost, amount to more than 1,000,000. As for the left bank of the Mekong, it is, in comparison, practically uninhabited, as all the villages are situated on the right bank.

The whole of this country swarms with wild animals, and at different places are to be found wild elephant, tiger, leopard, bear, pig, and deer. I occasionally saw the huge, circular tracks of wild elephant on the path in the forest, and once or twice the spore of tiger in the vicinity of our camp attested the presence of that uncanny nocturnal visitor. Several times my faithful "boy" told me in the morning, with a tremor in his voice, that he had heard the roaring of a tiger during the watches of the night. I never had that luck myself, I'm sorry to say, as the deep and dreamless slumber of a tired wanderer generally made me oblivious to all the nightly sounds of the forest, however strange or weird they might be. I, however, had the pleasure, such as it was, of seeing a real live leopard at home in his native jungle. Not that I had any desire to call on the gentleman, and cultivate a closer acquaintance—an unsocial disposition which, I rejoiced to see, was even more marked on the part of the leopard. It was early morning, and I was quietly trotting along on my Lilliputian charger, when a kind of exaggerated cat, so to say, slouched across the path. Without condescending to take the slightest notice of a British Consular official, he disappeared through the undergrowth at a rapid pace, and took with him, I might add, my hearty wishes for a *bon voyage*.

I heard of few fatalities of natives from attacks of tiger, but in several places I was informed of their depredations on ponies and cattle. Not only is the population scanty, but there is apparently such abundance of deer and pig that little necessity exists for beasts of prey to approach the haunts of men in search of food. At one place, however, near where we camped at the ruby mines, a native, who was sleeping out in the open with two others, was pounced upon by a tiger, and so severely mauled that he died. And in the north of Siam the sad story of an old woman who had been devoured by a hungry tiger—and a very bold and hungry beast he must have been to have tackled an old Siamese woman—kept our whole caravan in a state of excitement till the scene of the unhallowed repast was left far behind.

The journey from Siamrap to Korat occupied eighteen days, and that from Korat to Nongkhai fifteen days, and we suffered greatly from heat and want of water. Not that the temperature went up to abnormal heights, but on the close stuffy day that it reached 105° in

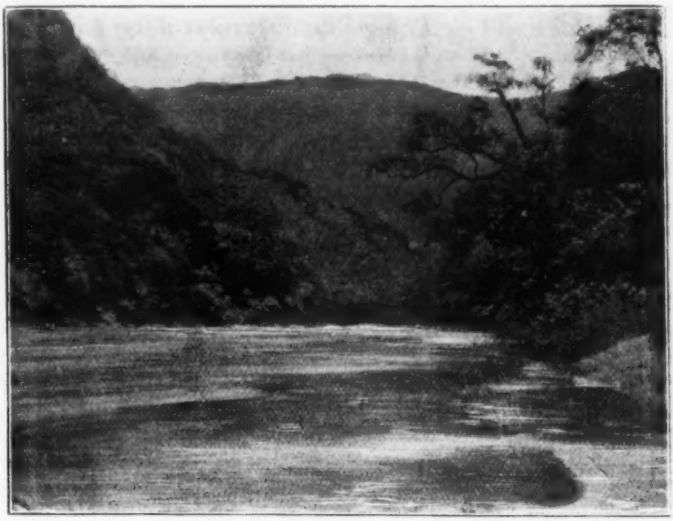
my double-roofed tent under the shade of trees, I felt it was quite as high as any human being would care to see it. This is the hottest season of the year, and the temperature, even in the substantial well-built house which I occupied in Korat, generally ranged up to nearly 100°, and remained over 90° till some time after sundown. The nights, luckily, were cool, the minimum in the early morning just before daybreak often marking 76°.

All the small streams were dried up, and the rivers reduced to mere driblets of water. We depended for drinking-water on stray pools, which marked here and there what would be the bed of a stream in the rainy season, and as cattle and buffaloes had been wallowing in these for months back, the water was not, to put it mildly, of the sweetest and most inviting description. In the neighbourhood of Korat the surface of the ground is in some places covered with an excrescence of salt like hoar-frost, and the streams are brackish. Here part of my impedimenta was a cart-load of green cocoanuts, with which I quenched my thirst; but a sickly and disagreeable drink it is when taken in any quantity. The town of Korat, like many others in this district, depends for its drinking-water on an immense marsh outside the walls. When I was there in the height of the dry season, the water was so low that the people had to wallow through the mud and carefully dip up the precious fluid with dippers, and even when it was both boiled and filtered it did not lose its marshy taste and aroma. In the rainy season, again, there is plenty of water everywhere; too much of it, in fact, as communication by bullock cart is rendered extremely difficult, if not impossible. Altogether, on account of heat, want of water, a monotonous jungly country, a toilsome and dreary method of locomotion, disease and pestilence, I was glad to reach the banks of the mighty Mekong, and turn my back on this desolate country.

At Nongkhai I received a warm and cordial welcome from H.R.H. Prince Prachak, the Siamese Chief Commissioner, who not only lodged me in a specially built house and treated myself and men in a right princely fashion, but, to my astonishment and delight, presented me on arrival with a bottle of Bass cooled in ice made in his own royal ice-machine. He also distilled the brackish water of the place, and my recollections of this pleasant spot are mostly connected with the joys of revelling in an unlimited quantity of distilled water and Bass beer in ice.

It was at Nongkhai that I first gazed upon the great river of Indo-China, the Mekong. Even at this point, more than 1000 miles from its mouth, the Mekong is a magnificent stream, and the sight of this vast volume of water nearly half a mile wide, issuing from the unknown regions of Tibet and sweeping on grandly towards the distant ocean, gives rise to feelings of the deepest admiration and awe. My feelings of admiration and awe were, however, quickly changed

to those of dismay and abhorrence when I reached the Chiengkhan rapids, and spent eight long and anxious days battling against the surging and boiling waters, creeping cautiously round jagged rocks, pulling strenuously with ropes, shoving with boat-hooks, struggling and shouting, or simply sitting helplessly in the bottom of the rude dug-out with secret terror in my heart, as I gazed at the wildly hissing water, and speculated how far a body would be carried before it reached the surface of these boiling whirlpools. Twice we had to unload the boats and transport all baggage across the rocks and sand, but this was the most difficult season of the year, on account of the lowness



RAPIDS ON THE MEKONG.

of the water. The river, of which the average width above the rapids is about half a mile, with say an average depth of 4 or 5 feet, here gets contracted into a narrow rocky channel not more than 60 or 100 yards wide in places, shut in by black and sharply jutting rocks from 10 to 30 feet high. In the rainy season the water rises and spreads hundreds of yards beyond this little channel, and then small boats creep along the banks in a somewhat easier fashion. The different rapids or shoots of water, which are each distinguished by a local name, number fourteen in all, and are spread over a distance of 50 miles. The intervening spaces are, of course, not so difficult as the rapids, but during the whole of these eight days the ropes were hardly ever cast off the boats.

As the river here literally forces its way through a range of hills, the scenery is wildly picturesque. Rugged forest-clad hills rear their lofty heads at every turn, and, after surmounting a fierce and impetuous rapid, it was a great pleasure to paddle along smoothly for a space and quietly enjoy the ever-changing aspects of this delightful mountain and river scenery. Inhabitants were almost entirely wanting, and every morning I was awakened by the crowing of jungle fowl, the calling of wild peacock, or the loud prolonged and intensely mournful howling of monkeys.

Let us glance at the Mekong from a commercial point of view for a moment. It has been the hope of that gallant nation who now own the left bank of the Mekong from its mouth to the confines of the Chinese Empire, that it will prove a highway to the riches of that populous and secluded country. Now, the Mekong has never been, and one is tempted in a spirit of prophecy to add, never will be, a commercial highway to the south-west of China. There has never been any trade, even a local trade, between Yunnan and any of the middle or upper portions of the Mekong. What trade there is has found its way by land from the frontiers of the Shan States and Yunnan in a south-westerly direction towards Chiengmai and Burma, and trade does not choose a toilsome land journey by caravan in preference to a river journey without the best of local reasons. And when railway facilities are created for the assistance of this struggling trade, it is much less likely that it will be directed towards the barren and unpopulated region of the Mekong.

There are no less than three barriers to navigation where the rapids are particularly furious and impassable—(1) Khone, (2) Kemmarat, (3) Chiengkhan. The Khone rapids are the most difficult, and the little French gunboat, 90 feet long, which surmounted those of Kemmarat and Chiengkhan, had to be conveyed over a Decauville railway at Khone. The feat that Lieut. Simon has accomplished in the *Grandinière* is one that deserves the highest praise, as, in ascending these frightful rapids, he placed his own life and that of his crew unreservedly in the hands of the steersman for many days. Difficult as it may be to ascend, it is much more difficult to descend, and the *Grandinière* will probably have to remain permanently at Luang Prabang. Continuous steam traffic on the Mekong is beyond doubt chimerical. On the level reaches, between the different series of rapids it would be very convenient, doubtless, to have launches to convey the Government mails and stores, but I cannot imagine any commercial man in his sane senses undertaking to run steamers there on business principles. The local trade between Luang Prabang and Nongkhai, the two great centres on the middle Mekong, may amount to perhaps one hundred boats annually. But what kind of boats? Mere hollowed-out trunks of trees, for the primitive Lao of this region have not yet learned the art of boat-building; and even if these canoes were loaded with gold and silver instead of only cotton,

mats, silk, and salt, would the value of their trade be enough to justify a flotilla of steamers on the Mekong?

It was May 9, and the rainy season had begun, when I left the river at Paklai and struck across country to Nan and Chiengmai. I travelled now at the head of a train of twelve elephants, and, as the season was advancing and the streams getting full of water, we hurried on, marching generally from dawn to dusk, with frequent changes of elephants. The country is exceedingly rough and hilly between Paklai and Nan, and the roads are mere mountain paths, more often than not only the rocky beds of streams. It was marvellous with what patience and skill the

A STREET IN KORAT.

ponderous elephants carefully toiled up precipitous ravines as steep as a staircase, and slid down fearsome inclines with all the facility of trained acrobats.

What a trumpeting and bellowing of content there was from these tired and footsore elephants, as we halted for the night and unstrapped from their backs their howdahs and burdens; and what bustle, confusion, and shouting there was every morning getting them loaded again at the earliest break of dawn! Life then was reduced to a daily worry of packing and unpacking, as everything had to go into handy form to fill up the small recesses of the howdah. But once on the march, safely hoisted upon the back of my unwieldy Jumbo, I was comfortable for the day. The rain might fall in torrents, as it generally did, or the sun come out with blinding glare, but I was secure under

cover; and whether the elephants were slouching through a bog, or slowly zigzagging up the face of a hill, was a matter of indifference as far as my comfort was concerned. With a book, a sandwich, and a bunch of bananas for lunch, and a packet of Siamese cigarettes, I was happy for the day, and often went peacefully to slumber for an hour or two, even though it was rather a tight fit to squeeze inside the narrow limits of the howdah.

Soon after the watershed between the Mekong and Menam was passed, the character of the country and people changed for the better. Instead of passing through interminable flat jungly plains as in Eastern Siam, we traversed now a country of sparkling streams, fertile valleys, and beautiful blue hills. The people had the look of being more active and well-to-do; their houses were large and solidly built, and their temples substantially constructed of durable teak and brick. One of my men, who was a Chiengmai Lao—that is, tattooed from waist to knee in contradistinction to the Lao of the Mekong, who are only slightly tattooed on the thighs—had all along, during this journey, been sounding the praises of the Northern Lao country, and expressing his contempt for his brethren of the east. Now at every turn he was calling on his companions to admire the riches and beauties of his own country. Inwardly I assented to all he said, and felt that the change was most striking from the miserable, poverty-stricken Mekong valley to the flourishing Menam, where there was not only beauty of landscape, but the bustle and animation of business and material prosperity.

The extensive forests of teak are at present the chief source of the wealth of this country. Northern Siam divides with Burma the monopoly of supplying the world with this valuable timber, and the share that Siam annually turns out is valued at over a quarter of a million sterling. These teak forests are worked almost exclusively by Burmese British subjects, and the wood is bought and shipped by British firms to London. The amount of British capital invested in this industry alone must amount to at least a million sterling.

It is a curious fact that the zone of teak seems to stop at the limit of the Menam watershed, for on the Mekong slope teak does not appear to grow in any quantity, and what has been observed is small and stunted. The only exception to this is on the Me Ing. It has never been heard of on the left bank of the Mekong.

Nan is a pleasant little town of three or four thousand inhabitants, and is likely to be a busy centre of the teak trade in the near future, as one of the large British teak firms is anxious to extend its operations to that province.

At Pre, which is the next place of importance on the way to Chiengmai, I was delayed a few days by heavy rains and floods. I was very kindly entertained here by Dr. Briggs, a medical missionary, who employed his skill and knowledge in doctoring three of my men who

were prostrated with malarial fever. My cook—a Chinaman—had suffered a great deal during the journey, and I had only kept him alive, on the way from Nan to Pre, by repeated brandy cocktails and spoonfuls of bovril. I had, to my surprise, entirely escaped fever myself, and I attribute this chiefly to the strict precautions I took with water, which I never touched unless both boiled and filtered. Even at native banquets, which it was my fate to attend in ceremony in all parts of the country, I invariably smuggled in, more or less surreptitiously, a bottle or two of my own precious water. The uninterrupted use of a mosquito-net, too, even when there were no mosquitoes, probably assisted greatly in keeping off an attack of malarial fever. I also took five grains of quinine every three or four days, and in particularly malarious regions, two grains night and morning.

At Pre I remember, as one of the many curious experiences of this journey, that I attempted to join in the Lao hymns which the worthy missionary and his household sang at family worship. Dr. Briggs is a Canadian, and his favourite tune was "God save the Queen." To sing Lao hymns to the tune of the National Anthem whilst a bevy of merry brown native girls chimed in with their sweet voices is an experience, I am sure, which is given to few men.

Chiengmai, which I reached on June 20, is the capital of Northern Siam, and a very flourishing, busy, and cheerful town it is. It contains a population, I should think, of twelve thousand, and is prettily situated on the Meping 1000 feet above sea-level, with the lofty and forest-clad peak of Doi Suthep towering up behind to a height of 5500 feet. The European population here numbers about twenty, and they are all missionary or teak-timber men, with the exception of Her Britannic Majesty's Consul.

The latter part of my journey was by boat from Chiengmai to Bangkok, a distance of 537 miles, and that was accomplished with the rising floods in eighteen days, including stoppages for official purposes of four days. The rapids on the Meping, which are not nearly so dangerous or impressive as those on the Mekong, were all passed in a day and a half, and I found it much more exhilarating to shoot swiftly down such watery inclines like an arrow, than slowly fight our way up them. The gorges are quite narrow, lofty, and covered with dense masses of green vegetation, and every sweep of the river brings to view new and exquisite panoramas of rugged landscape. On the way down I called in at Lopburi, one of the ancient capitals of Siam, and there I took a photograph of the ruined palace of Constance Phaulkon, a Greek adventurer, a man apparently of great genius, who attained the post of prime minister in Siam towards the end of the seventeenth century. He was ultimately assassinated in a court intrigue, and his memory is still preserved in Lopburi.

The Menam valley is, comparatively speaking, well-known country, and I shall here only endeavour to draw your attention to one or two significant facts about it, so that you may picture to yourselves the contrast between the Mekong and the Menam valley.

Siam, as I have remarked at the opening of this paper, may be divided into the two valleys of the Menam and the Mekong, and the total average import and export trade for the kingdom of Siam, based on the returns for the past three years, amounts to four and three-quarter millions sterling per annum. As I have estimated the total export and import trade that passes to and from the Mekong region at about a quarter of a million, it follows that the balance of the remaining trade of four and a half millions sterling per annum is carried on with the Menam valley. These statistics show at a glance the relative importance, as far as the outside world is concerned, of these two regions; and, as the great proportion of this trade is carried on by British energy and British capital, you can well understand the satisfaction of the mercantile community to find that this, the important and vital portion of the kingdom of Siam, has, by the recent agreement concluded between England and France, been placed in a position of absolute security and freedom from armed interference on the part of either country.

Nor does four and a half millions sterling represent in any degree the trade that the valley of the Menam is capable of when properly developed, and when its five or six millions of inhabitants are brought within easy reach of British markets. The export of rice, the principal production of the country, which averages nearly two millions sterling per annum, is drawn to a very great extent from the delta of the Menam alone, and not many miles from Bangkok there are extensive tracts of rich alluvial soil which need only canals to bring them within the area of cultivation.

The fertile valleys of Northern Siam, too, require to be brought into closer connection both with Bangkok and Burma, and it is to the object of constructing a Trunk railway up the valley of the Menam, and throwing off branch lines to the Burmese frontier, that the Government of Siam should strenuously devote itself. Nor should the extension and repair of the canals in the Menam delta be forgotten, for in that low alluvial land canals are even a more important factor for development than railways.

In concluding this paper, I might take the opportunity of paying a brief tribute of thanks to the Siamese authorities, and particularly to H.R.H. Prince Damrong, the active and talented Minister of the Interior, by whose special orders my transport throughout the whole of this extensive journey was admirably arranged. It was to his foresight, and to the care and energy displayed by the local officials, that I was nowhere subjected to delay, and that I completed this tour round Siam without any serious mishap.

Before the papers were read, the PRESIDENT said: We are honoured this evening by the presence of the Prince of Siam, son of his Majesty the King of Siam. The papers to be read are on kindred subjects. The first by Mr. Clifford,* on some of the Malay States on the eastern side of the peninsula—about which we are almost in complete ignorance, I think, until we shall have heard his paper; and the other will be an account of a very interesting journey round Siam, by Mr. Black, of her Majesty's consular service in Siam. I will now ask Mr. Clifford to read his paper.

After the reading of the papers, the following discussion took place:—

Sir HUGH LOW: I am afraid I can add very little to what Mr. Clifford said in his admirable paper. I don't know that part of the country well, having only visited parts of it. Mr. Clifford has travelled through it, and, I suppose, knows it better than any other person who has ever been in it. He came to the country, where I was at the time, about twelve years ago, when quite a young man, and at once showed his great powers of endurance by going into the jungle in all kinds of weather; and he has told us how he forced himself to live upon the native food, which I don't think any other person could have done, and carried out the expedition he undertook with so little difficulty. He is about to go back to these countries, and, although Pahang has not been under the care of British officers long, I have not the least doubt that, when he has been there for a short time, we shall have great improvements by federation with the most prosperous states on the western side of the Peninsula; and federation will enable Pahang to be developed, a policy which has been successful—as all our policy has been lately—so successful that scarcely anything can be compared with it in recent history. It is not for us to talk about the commercial advantages of the place, but the jungles, and the country through which Mr. Clifford travelled, really contain some of the most glorious scenery, the richest botanical products, and the most beautiful zoological productions in the world. Mr. Black mentioned the peacocks. These are far more handsome than those we have in England; it is a most glorious bird. I don't think I can say anything which would add to our knowledge, but I am sure that this Society will wish Mr. Clifford every possible success in this most important post to which he has been appointed, as Resident at Pahang—that country which is said to contain minerals in abundant quantities, which are already profitably produced, though scarcely prospected at all by Europeans. They are crudely worked by the Chinese and Siamese, but could be produced in greater abundance than in any other part of the world; and I have not the least doubt that many other rich productions will soon be developed now that this federation is under the protection of officers who are going to take charge of it.

The PRESIDENT: We also, I believe, have to welcome here this evening the presence of Mr. Swettenham, who has been kind enough to bring some interesting curiosities from the Malay Peninsula, and I trust he will address you on some part of the subject Mr. Clifford has brought before us.

Mr. F. A. SWETTENHAM: There are one or two things I should like to say, not so much with reference to Mr. Clifford's paper, because he has said all there is to be said. His journey was very remarkable, and I am specially glad to be here this evening, because I think I may claim some credit for having suggested to this Society that they should ask Mr. Clifford to read this paper. I should like to say, with reference to the geographical portion of the question, that Mr. Clifford has been able to fill up a blank space on the map. Twenty years ago the map showed

* Mr. Clifford's paper will be published in a subsequent number.

only the outline; since that time we have done something to fill up all the western part of it; but until the other day—I speak of last year—the part that is now filled up was quite blank, and this Mr. Clifford and his friends have done. I hope this Society will put it in the way of being seen by the public. If the Royal Geographical Society would aid the efforts that are being made in the East by a sister society, a branch of the Royal Asiatic Society, we might in a short time get a really good map of the Malay Peninsula. As I said, twenty years ago nobody thought it worth while to try and fill in any part of the Malay Peninsula. Sir Hugh Low reminded us that we must not discuss commercial topics here, but I trust that, as we are a nation of shopkeepers, you will forgive me if I allude to matters which are, in a way, commercial. Our interest in the Peninsula has been forced upon us. The British Government for many years absolutely refused to have anything whatever to do with the Malay Peninsula. We were established in a few small places marked in bright red on the map. The British had a colony, and outside that they declined to go, until the state of things in what I may call the Hinterland became so bad that we were compelled to go in against the wishes of the British Government. The result of our going there has been that we have done a great deal of good. The places which yielded a very small revenue indeed ten years ago, $400,000, now yield $8,000,000, the colony itself only yielding $4,000,000. The colony is more than a hundred years old, and we have been in the Malay Peninsula only twenty years. There is not a railway in the colony, and we have 200 miles inside the Malay States. I ask your pardon for mentioning these commercial matters, but they are of some importance. I hope that, by means of the scheme for federation which has lately been sanctioned by the Secretary of State for the Colonies, we shall be able to so extend these railways that by-and-by the Malay Peninsula will become quite an important place, and that Malacca will become the port for the valuable mineral and agricultural products of the Peninsula. All that is due to one great fact which I think we are far too apt to forget, which is, that our presence in the Straits of Malacca is due to the foresight of one man, Sir Stamford Raffles. Everybody who knows anything about his life must recognize that he is one of the greatest Englishmen that ever lived, probably the greatest who ever got as far as he did, and I fear one whose history, character, and career have been the least recognized and least known, although whatever we are and whatever we shall be in the Straits of Malacca is really due to his great foresight and desire to advance the interests of this country.

Mr. F. Verney: I have really nothing to add to the very excellent remarks which have been made by those who have had the opportunity of serving in that distant and most interesting country. Perhaps I may be allowed to say a word with regard to the relations which have recently been established between England and France in the country of Siam. I must not trench on the question of politics, but would say this, that we must fervently hope that the arrangement may tend to the advancement and progress of the country, which we have so much at heart. I hope that no one here will think for a moment that commercial rivalry need be co-existent with a kind of commercial hostility. I think there is plenty of room for healthy commercial rivalry in this great country, and we should not in the least deny to France the rights we claim. We hope, by advancing in healthy rivalry, we may, without doing any harm to the king and country of Siam, go ahead in a way advantageous to Siam itself, and not disadvantageous, but of great gain, to the two commercial countries which have their interests so largely developed in Indo-China. We must have been immensely interested by the excellent papers we have heard. It requires splendid health, first-rate temper, a knowledge of the language of the country, and great experience, to produce such

good explorers as we have listened to to-night, and Englishmen, going into these countries, and making nothing of the toil and hardships they go through, giving such excellent representations of the journeys they have made and the countries they have visited, offer us the main chance we have of learning something of, and adding to our interest in, those distant lands. We feel heartily obliged to these two gentlemen who have been exploring these countries, and who have brought back such interesting accounts of them to us.

Mr. J. G. Scott: After the two papers which have been read to us, it seems rather invidious to call upon a person like myself, with a superficial acquaintance of the country, to make any remarks at all; but I think I shall be only representing the feeling of this meeting when I say that the little we have heard will make us look forward to the proceedings of the Society with the greatest interest. I should like to make some remarks with regard to Siam. A little earlier than Mr. Black, I travelled in Siam, and crossed his route. A few remarks which Mr. Clifford made about his hardships in Trengganu and Kelantan suggest to me that it would be as well, seeing that Siamese listeners are here to-night, that I should thank the Siamese Government for the facilities they placed at the disposal of myself and Mr. Black in travelling about the country. So far as I am concerned, I can safely say that I never had to test my capacity for putting away the rice which Mr. Clifford spoke of as the diet of which one has to take a great deal before being satisfied. There are a great many British subjects in the north of Siam, a great many Burmans and Shans. It is a curious fact that both Burmans and Shans are agriculturists in their own country. Agriculturists in this country are not in so good a position as they, for in Siam you only have to tickle the ground. Considering the number of British subjects in Siam, it is a matter of great pleasure to us that that country, which was in a dubious position owing to its two neighbours calling each other bad names, is now guaranteed on both sides. In travelling through the country, one sees an extraordinary number of ancient ruined cities, the city walls grown with trees, which shows they must have existed more than a hundred years ago, and from the ruins it would appear that the population must have been very great. We may hope, now that Siam is settled and at ease, that the population will grow to be as great as ever, and it is in this central part of the country that the population will settle. The country to the east, which some people seem to think belongs to France, is much less interesting. Mr. Black's paper, when it is published, will give you an idea of the country, but I think it is waterless, and that the population from there will most probably go to the centre of Siam, and will help to swell the amount of British trade, which is already 97 per cent. of the whole trade of Siam. The Mekong, of which I saw the upper part, and Mr. Black the middle, is a very fine river to look at, but it is not such a fine river as the British river, the Salwen. It never can become a commercial river at all. Lieutenant Simon has taken a gunboat up above the rapids to Luang Prabang, which shows it is feasible for pluck to conduct steamers up the river; but what a brave man will do a commercial man will not do, because it won't pay. Mr. Verney said that we might look upon the French rivalry with friendship. I think that if they intend to use the Mekong river, we may look upon their efforts to take the trade down with indifference.

Mr. R. L. Morant: I don't wish to keep the meeting; but, if I may, I should like for a moment to add my humble testimony to what has been said about the work done round the Peninsula. I had the honour of going to each centre of government there with H.M. the King of Siam in 1889, on which occasion I was able to look at it, not only as a Britisher, but also, of course, through Siamese spectacles —that is, looking at the methods of the British Government from the point of

view of an Eastern monarch. We went down the west and up the east coast. The contrast was striking as one came up to the more northern ports of the Peninsula, where the suzerainty is not British. I well remember the remarks his Majesty made at the time, that it was quite visible what could be done by good administration. I only wish to ask a question upon two points of some importance. On most maps there is marked a river flowing through Korat down to the Mekong; when I went to Korat in 1894 I did not see anything in the nature of a river which would be of any use. The question is of some importance politically as well as geographically. Perhaps Mr. Black, who was there at a different season, saw something of the kind. As far as I can make out, everything in the nature of commerce must come westwards, that is to say, westwards from Korat. I would also like to know whether it is yet finally decided for the railway to go as far as Korat, or to stop at the point it has now reached. In its present condition it will not largely assist trade, though it has its uses. I shall never forget with what delight we walked along the top of the embankment after toiling over heavy jungle tracks. At the same time, if rails were laid it would be probably somewhat more useful to Siam generally. One would like to know if Mr. Black has any opinion on these points.

Mr. BLACK: As regards Mr. Morant's first question about the river flowing eastwards from Korat to the Mekong, there is such a river called Nam Mun. It flows past Korat, about 13 miles distant. It is a very small stream there, and in the dry season it contains only a few inches of water. Where it enters the Mekong its course is obstructed by rapids, and even the native boats, which at present go down that river, are obliged to have their goods taken out and carried overland; so that in its present condition, for the purposes of commerce it is not what might be called a practicable river. In the rainy season, of course, there is a great deal of water, and launches could, and, in fact, I believe a couple of launches were run for a short time from a place near Korat called Ta Chang down to Ubon, below which the rapids begin. Trade on this river could be fostered and developed, but this would take some time. As regards the railway, I am sorry to say that I have no information to give. If it were continued to Korat, it would develop an entirely new country, and pass over a tract which is now very difficult to traverse. At present this railway has been constructed for a distance of 75 miles, or half way. There still remains a distance of from 80 to 85 miles to Korat to be constructed.

The PRESIDENT: It now only remains for us to thank the authors of these two papers. Mr. Clifford has opened to us countries which, I may say, were almost entirely unexplored. It is true that the coasts of these countries have been known for centuries. I remember well that the great Arctic navigator, John Davis, was becalmed for many days off that coast of Trengganu and Pahang, and in sight of these lands he lost his life through the treachery of some Japanese pirates. But with regard to the interior of these states, we know next to nothing. We must all admire the hardihood and pluck with which Mr. Clifford explored them, and I think we must also applaud the gallantry of those youngsters who, in a dark night, risked their lives down the rapids; for, although it was only to bring their master his dinner, still it was an act of heroism. His account of the country is instructive, and his narrative of the journey most interesting. I am very sorry that Mr. Black was obliged to skip a large portion of a very valuable part of his paper, because he was afraid of boring you, which I am sure he would not have done. What he has told us is certainly most instructive and interesting, and I know you will desire me to return your cordial thanks to Mr. Black and to Mr. Clifford for the papers we have listened to this evening.

A JOURNEY IN THE VALLEY OF THE UPPER EUPHRATES.

By VINCENT W. YORKE.*

Divrik at present contains about 4000 families, of which 800 are said to be Turkish, and the rest Armenian. The town, which is situated on the edge of an extensive plain, is loosely built, with many gardens, and has a fair bazar. Its name and situation would point to its identity with Tephrike, an important fortress of the Paulicians in the ninth century A.D. It was founded by Carbeas, the leader of this powerful sect, in 855, and for nearly twenty years was the cause of much trouble to the Byzantine Empire. It was eventually taken by the Byzantines during the reign of Basil I. in 873.† The place afterwards came into the hands of the Seljuks, who, according to St. Martin,‡ were driven out by the Mongols in 1243.§

After a thorough search for antiquities, we could find no remains which can be with certainty ascribed to any period older than that of the Seljuk occupation. There are two ruined castles at Divrik, the largest of which occupies a strong position on a steep rock overhanging the modern town. Round the top of this rock there exists a circuit of walls, preserved at some points to a considerable height, which may in places be as old as the time of the Paulician occupation. Within these there are also remains of what may once have been a church, though, if this was ever the case, it has been largely modified in the Seljuk style. The other castle is built on a high pinnacle of rock on the further bank of the Chalta Irmak. It is much smaller in extent, and less well preserved. The graveyards of the town did not contain a single inscription, or even any worked stones which can be assigned to the Byzantine age. Remains of the Seljuk period, on the other hand, were abundant; there are numerous small chapels and tombs, for the most part octagonal in shape with pyramidal roofs, which show Seljuk work

* Paper read at the Royal Geographical Society, May 13, 1895. Map, p. 428. Continued from p. 335.

† Other settlements of the Paulicians in this district mentioned by the Byzantine historians are Argaoun and Amara (or Abara), founded by Carbeas, Koptos Spathe, and Tauras. None of these have as yet been identified.

‡ *Op. cit.*, p. 188.

§ Divrik has been identified with Abrik of the Arab geographers by l'Estrange in his notes to a translation of Ibn Serapion (*Jour. Roy. Asiat. Soc.*, 1895, p. 54), but he has changed his opinion subsequently in deference to Hogarth, who would identify Abrik with the modern Arabkir (*vide J.R.A.S.*, 1895, p. 740). But his original identification is confirmed to a certain extent by the occurrence of the variant Αφρικὴ for Τεφρικὴ in two passages of the Byzantine historians (Sym., 8. 455, B.; Leon., 255.16), while the old name of Arabkir, as given in the fiscal archives, appears to have been Nareen (Taylor in *Jour. R.G.S.*, *loc. cit.*, p. 311). Abrik was visited by Ali of Herat in the twelfth century, and was then a place of pilgrimage held in veneration alike by Christians and Moslems. A curious passage from Yakut (i. 87), giving Ali's description of the place, is translated by l'Estrange (*J.R.A.S.*, *loc. cit.*).

in various parts of the town; and on an eminence below the larger of the two castles there stands a magnificent mosque, built, according to an inscription on the north door, for Kai Kosru II. (*c.* 1240), which must be one of the most splendid monuments of its style and period in existence. As it has attracted very little notice from previous travellers, it will be well briefly to describe it.

The mosque is oblong in shape, lying north and south, and measures 87 yards by 47 yards. It has three great stone portals, two on the west side, and one on the north. The north door is very richly decorated, and, except at the bottom, where it has been in part rebuilt, is in a good state of preservation. The system on which it is designed is that of a pointed arch within a rectangular frame. The sides of the frame are supported by clusters of pillars, and on each side of the arch and above it a line of very elaborate ornament, consisting of rose-medallions, crescents and stars, and lotus-buds, is worked. These are in many cases almost completely detached from the background. The south door of the west side is similar in shape and design to the north door, the chief ornament used being heavy and elaborately carved foliage. The third door is more simple in style, and is ornamented almost entirely with the honeycomb pattern. On each side of it, in panels cut in the projecting buttresses, are representations of the two-headed eagle, the badge of the Seljuk sultans; and against the main wall, close to them, another strange bird, which is probably meant for a hawk. The mosque inside has a stone vaulted roof, ornamented at the keystones with bosses, on which shells and flowers are carved. It was originally supported by sixteen hexagonal piers, which have been roughly built up in recent times. From one of the cupolas hangs a "blue stone," *i.e.* a ball of Persian porcelain, to which magical properties are ascribed. The whole building is now, unfortunately, in a very bad state of repair, and a large portion of it will probably within a short time fall into ruins.

From Divrik we made our way back to Zimarra by a longer but easier route, which skirts the base of the high mountain which we had climbed in coming. We followed the Sivas road on leaving Divrik for half an hour, and then took a path which goes off to the right and crosses the river by a stone bridge with two arches. We then followed the course of one of its tributaries, the Hornova Chai, until we reached the Armenian village of Hornova, and soon after crossed the watershed between that stream and another which flows into the river of Divrik. Our path then led us down a small and gradually deepening gully to the village of Karageban, which is six and a half hours distant from Divrik. Karageban is a village of sixty houses inhabited by a singularly handsome race of people, who spoke Turkish and claimed to be Turks. Here we spent the night, and the next day proceeded to Zimarra, which we reached in two and a half hours. From Zimarra we took the direct route by Hassan Ova to Kemakh.

At one hour beyond Zimarra we stopped at some ruins on a small stream a short distance below the village of Zinika. These ruins, to which allusion is made in 'Arch. Epigr. Oester.' (1884, p. 239), are those of a small fortress of circular shape, built round a low mound about 50 feet high and 200 yards in circumference. The walls consist of an outer line, within which, at an interval of about 20 yards, is a small enceinte; they are built of large mostly unsquared blocks of limestone laid in uneven courses, the gaps being filled up with small stones and a little mud mortar. It is difficult to determine the period to which these remains belong; the rude style of building would point perhaps to a pre-Roman date for the walls, and the mortar used in them to a Roman

THE EUPHRATES ABOVE CHERMUK (LOOKING SOUTH).

restoration of the same, but without further evidence no definite conclusion can be arrived at with respect to their age.* There is a direct path leading from these ruins to Pingan, not more than 4 or 5 miles distant.

From these ruins we proceeded by an easy path, which led us, after three hours' travelling over bare and undulating country, to the village of Dostal, situated only a short distance from the western Euphrates. The inhabitants of this village, which consists of forty houses, though they described themselves as Kurds, talked nothing but Turkish. At Dostal we were told of the existence of a "written stone" a short distance from the village and close to the road which we were following

* It is quite possible that the remains may be those of the fortress of Hisn-al-Minshar mentioned by Ibn Serapion, as Hogarth suggests (*vide J.R.A.S.*, 1895, p. 746).

to Hassan Ova. This stone we found to be a Latin inscription bearing the name of the Emperor Decius on a panel cut in the living rock on the further or left bank of the Kara Budak, a tributary of the Euphrates at a point situated about 4 miles from Dostal, and about the same distance from the junction of the tributary with the river. On the right bank of the Kara Budak, opposite the inscription, there are remains of an abutment of a bridge, and on the left bank the rock is cut away for a short distance to carry a road.

As is often the case, the name of the river over which the bridge was built is given in the inscription, and, curiously enough, it appears to be the same as that by which the Romans called our own Severn, *i.e.* Sabrina. Its discovery gives certain indication that a Roman road passed the stream at this point.

From the spot where we found the remains Hassan Ova is reached in one and a half hour, and a road to Kuru Chai goes off to the left fifteen minutes after leaving the bridge. At Hassan Ova, which is situated close to the Armidan Chai,* another considerable tributary of the Euphrates, and one which has as yet found no place in Kiepert's maps of Asia Minor, we saw some signs of an ancient site in some columns and capitals, probably of Byzantine date, lying in a ruined hut by the side of our path. Unfortunately, we were prevented from searching the village for further evidence of antiquity by the fear of being detained in quarantine. Hassan Ova lies on the frontier between the vilayets of Sivas and Erzingan, and eleven days' quarantine had been imposed on all travellers coming from the former province. Any delay might have led to our detention in the wretched village, which is notorious in this part of Asia Minor for its bad water, for eleven days, so we hastened on, fortunately without being perceived by the official to whom the supervision of this part of the frontier had been entrusted.

A short distance above Hassan Ova the country through which the western Euphrates flows becomes mountainous on the right bank, and our path struck up into the hills, and, after a long and easy ascent, reached the height of 6458 feet.

We then crossed a well-cultivated upland plain until we came to the valley of the Nezgieb Chai, which we followed down to Nezgieb, a Turkish village of fifty houses, distant three hours forty minutes from Hassan Ova. After leaving Nezgieb, we travelled for rather more than an hour down the bed of the same stream; the path then mounts from the left bank, and crosses the heads of numerous *derés* formed by small tributaries of the Euphrates. In this manner we gradually ascended to the edge of a high cliff, from which we had a view of the

* It is also called the Kuru Chai Su. Its course was followed by Taylor in 1866 (*loc. cit.*, pp. 308 ff.).

Euphrates and Kemakh on the further bank. At this point a severe thunderstorm, which had been brewing all day in the Dersim mountains behind Kemakh, broke over us, with the result that a small stream which lay between us and the town was turned into an almost unfordable torrent. By making a considerable détour we succeeded in passing this obstacle, and so reached the Euphrates. The river, which flows at this point through a high and precipitous ravine, is here spanned by a wooden bridge, which we crossed to ride down a ladder-like staircase into the town of Kemakh. We rode the whole distance from Hassan Ova to Kemakh in nine hours twenty minutes, but we travelled very slowly for the last two hours, and the journey could easily be accom-

THE WESTERN EUPHRATES ABOVE AGHIN (LOOKING NORTH).

plished in eight and a half hours. It is quite possible that the road which was so often traversed by Byzantine armies (Sebastea—Tephrike—Kamacha *) may have coincided with the route along which we travelled from Hassan Ova to Kemakh, but we saw no sign of any ancient road along our path.

Kemakh is a small town of about fifteen hundred houses, of which only thirty-five are Armenian. The town is clustered round a precipitous rock, which rises close to the left bank of the river, and on which there are remains of what must once have been an impregnable fortress. It most probably occupies the site of one of the several towns called Theodosiopolis, which existed in this part of the Byzantine Empire.† In

* Ramsay, 'Hist. Geogr.,' p. 56.

† *Vide* Ramsay, *op. cit.*, pp. 282 and 447.

later times it was one of the so-called Mesopotamian fortresses which the Arabs held along the line of the Byzantine frontier.* We stayed two nights in Kemakh, but were unsuccessful in our search for remains of the Byzantine period. Portions of the walls of the castle, which are in places still preserved to a considerable height, may be as old as those times; but it is more probable that the greater part of them are later in date, and the work of the Mohammedan conquerors. Within the walls of the castle there are ruins of many houses which may possibly be the remains of the Byzantine town, but we found no inscriptions or other evidence to support such an hypothesis. The churches which are reported to have been seen by other travellers who have visited Kemakh, do not exist at the present day.† Remains of the Seljuk period, consisting of a number of small chapels or tombs, very similar to those which we saw at Divrik, are plentiful in and about the modern town.

From Kemakh we followed the valley of the river to Erzingan, which is about ten hours distant. We left Kemakh by the bridge which we had crossed on entering the town, and shortly afterwards forded the Kiumur Chai, a considerable tributary of the left bank of the river. We then followed an easy path which keeps closely to the right bank. The river between Erzingan and Kemakh is generally from 80 to 100 yards broad; the stream is yellow in colour, and flows at the rate of about 6 miles an hour. We found the temperature of the water on June 6, at 4.30 p.m., to be 59° Fahr. The Dersim mountains descend abruptly to the left bank all along this part of the course of the river, but for seven hours of our journey the country on the left bank was fairly easy in character; the hills stand back from the river or slope gently down towards the bank. Three and a half hours before reaching Erzingan we came to the carriage-road which is in course of construction along the river-valley. The river, soon after the point at which we got on to this road, is hemmed in on both sides by hills, which continued until we reached the plain of Erzingan, when the road leaves the river. A ride of one and a half hour along the road over the plain then brought us to Erzingan. We met with few human habitations, except *khans*, in the river-valley between Erzingan and Kemakh, and we saw no sign of any old road or other antiquities along our route.

The following table is a list of distances and heights between Egin and Erzingan:—

Miles.		Feet.	Miles.		Feet.
—.	Egin	3342	23.	Karageban	4695
14.	Top of ridge ...	5913	23.	Dostal	—
11.	Pingan	3331	9.	Hassan Ova	—
14.	Kesmé	4874	13.	Nezgieb	5807
8.	Summit	7922	17.	Kemakh	3877
7½.	Divrik	3642	35.	Erzingan	4267

* L'Estrange, 'Palestine under the Moslems,' p. 38.

† Ritter, vol. x. p. 785.

Erzingan is situated in a large plain, which is surrounded on every side by high mountains. It is at the present day the principal military outpost against Russia on this part of the Turkish frontier, and the head-quarters of the 4th Army Corps. The town, which is badly built, is said to contain from 30,000 to 35,000 inhabitants. We could find no ancient buildings or other antiquities in Erzingan, which does not seem to represent any ancient site. The chief monument of the place is a modern mosque built in classical style.

At Erzingan we finally left the Euphrates, and made our way northwards to Sadagh, about ten hours distant on the other side of the high mountain range which bounds the plain of Erzingan to the north, and forms part of the watershed between the Black Sea and the Persian

GORGE OF THE WESTERN EUPHRATES BELOW EGIN.

Gulf. Sadagh, where ruins and antiquities have been reported by several travellers, lies close to the route which is travelled by the postal service between Erzingan and Trebizond. Following this route, an ascent of nearly four hours, by a path which nowhere presents any great difficulties, brought us from the plain of Erzingan to the top of the pass (8805 feet) over the Sipikor Dagh. The carriage-road, which is in course of construction between Erzingan and a point on the Erzerum-Trebizond *chaussée* near Giumush Khané, begins a short distance before the top of the pass is reached, and, though it is not yet metalled in many places, it is probable that before long the whole road will be completed, and it will be possible to drive all the way from Erzingan to Trebizond. After reaching the top of the pass, we rode down a green and pleasant valley to Sipikor, a Turkish village of one hundred houses.

From here we followed the carriage-road, which keeps to the left bank of a small stream flowing into the Kelkid Irmak (Lycus), and in five and a half hours reached Sadagh, which lies a short distance to the left of the road. Sadagh is a Turkish village of about a hundred and fifty houses, built for the most part of old squared stones. It is situated in a depression in the hills on the left bank of one of the main sources of the Kelkid Irmak, and has a fine water-supply which flows from a reservoir, which is artificially banked up above the village. The site lies close to the route up the Kelkid Irmak from Enderes *viâ* Ashkaleh to Erzerum. This route, inasmuch as it formed part of the old route by land from Constantinople to Erzerum,* was of great importance before the half-sea route *viâ* Trebizond to Erzerum was opened up, and in consequence the village has been mentioned in the writings of some of the early travellers to the East.†

In more recent years, it has been visited by Taylor in 1868, who copied a Latin inscription, and reported the existence of some Byzantine inscriptions in the village;‡ and subsequently by Biliotti, who sent in a description of the site, accompanied by a plan of the ruins, to the British Government. A Latin inscription was also copied on the site by Colonel Everett, and has been published in the Corpus.§ On the strength of the reports Sadagh was identified by Kiepert in his maps with Satala, the camp of Legio XV. Apollinaris.‖

There was nothing, however, in these reports and inscriptions to make this identification certain, and we devoted two days to an examination of the site, and a search for further epigraphical evidence. Our efforts were rewarded by the finding of several legionary titles inscribed with the words "Leg. XV. Apol.," the discovery of which must remove all doubt as to the identity of the site with Satala. Considerable remains of an ancient fortified town exist near the modern village. The walls, which consist of a rubble core faced with well-squared stones, seem to have formed a square enclosure, the sides of which faced the four points of the compass. They are best preserved on the north side, where the towers are still standing along the whole line and at the two corners. On the south and along part of the west side the ancient walls have been almost obliterated by the modern village, which is built over the south-west corner of the enclosure. As far as can be judged from the style of construction, the walls would seem to be of Byzantine rather than of Roman date, and are probably in their present form not older than the time of Justinian, who is known ¶ to have restored the fortifications of

* It is described in Ritter, vol. x. p. 751.

† Tournefort, Let. 21; Morier, 'Persia,' p. 331.

‡ Taylor, *loc. cit.*, pp. 287 ff. The inscription which he copied can be partially restored, and is undoubtedly one of the Emperor Aurelian. It has not yet found its way into the Corpus.

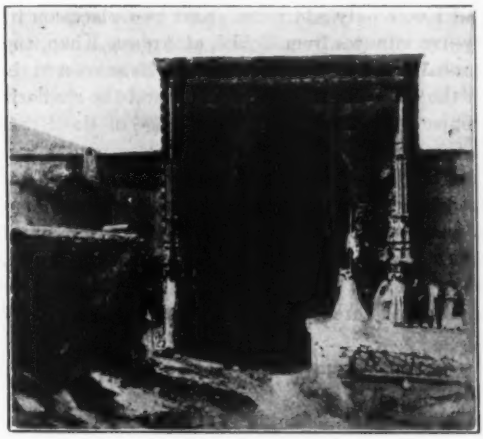
§ 'C.I.L.,' vol. iii. Suppl. No. 6744. ‖ 'Notit. Dignit. Orient.,' cap. xxxv.

¶ Procopius, 'De Æd.,' iii. 4.

the town. A short distance south-east of the site there are remains of an aqueduct, of which five arches are still standing. Above the modern village, near the reservoir, there are remains of earthworks, which possibly represent the site of a small fort which guarded the water-supply. There are also some foundations of a building outside the north wall, but not enough of it is preserved to indicate its character.

In the course of our stay we succeeded in finding, besides the legionary tiles and a considerable number of unimportant Byzantine epitaphs, seven Latin inscriptions. Of these two are mere fragments, and another, a milestone, is so weather-worn as to be wholly illegible.

With regard to the famous bronze head which was found at Sadagh



MOSQUE AT DIVRIK (NORTH DOOR).

and is now in the British Museum, we could obtain but little information. We were shown the place where it was found; the spot is within the walls of the site, and the man who turned it up was at the time of our visit still alive, though at the point of death. From the accounts of the oldest inhabitants, it appears that a thorough search was made at the time when the head and hand were discovered, and they all agreed in saying that nothing else was found, so that the reports which have been in circulation to the effect that the body of the statue is still in possession of the natives of the place, are probably without any foundation. Exactly the same account was given by one of the *beys* at Kemakh, the government engineer of the district, and our *Khanji* at Erzingan.

From Sadagh we made short excursions along two of the valleys which converge on the village from the west, the valley of the Lycus,

and that of another smaller stream to the south. In the valley of the Lycus, on the road to Kelkid Chiflik, at a village one hour distant from Sadagh, there are two columns, which may once have been milestones, though neither is inscribed.

On leaving Sadagh we regained the post-road from Erzingan to Trebizond, and went *viâ* Keusse over a high pass (7389 feet) to strike the Erzerum-Trebizond *chaussée* at a point fifteen minutes short of Tekké. The point where the two roads join is ten hours distant from Sadagh. One hour and a half after leaving Sadagh we saw what may be a Roman fort, 2 miles to the right of our road. We did not have time to visit it, but could make out with a glass that its walls consist of a rubble core faced with squared stones.

From Tekké to Trebizond the road has been described by numberless travellers, and I will only add notes about two places on it. At seven hours twenty-five minutes from Tekké, at Ardasa Khan, there are ruins of a castle, probably Byzantine, above the village on a high rock to the right. From the existence of these remains and the similarity of names, it may be conjectured that Ardasa = Αραδάση of the Byzantine lists.* At two and three-quarter hours beyond Ardasa, and ten hours before reaching Trebizond, a small group of *khans* is passed on the south side of the pass, which are called by the collective name of Zigana Khan. The name of one of the stations on the road of the Antonine Itinerary from Trapezus to Satala is preserved in Zigana,† but there is not the faintest trace of antiquity on the spot, and if the distances given in the Itinerary are correct, the station must have been rather further south.

At Trebizond our journey came to an end, and we took ship for Constantinople.

PART II.

The Roman Roads and Defences on the Upper Euphrates.

Having thus described our journey, I shall now endeavour to show what new light can be thrown by its results on the subject of the Roman roads and defences on this part of the frontier, discussing, firstly, the course taken by the roads, and the position of some of the stations on them; and, secondly, the history of their construction.

The general system of the Roman roads leading to and along the upper Euphrates may be said to be fairly understood, and is well set out in the writings of Professor Ramsay ‡ and Hogarth § on the subject. The system has as its centre Melitene, the *caput viæ* of the great road from Ephesus and Cæsarea, which doubtless followed the same course as the old trade-route to the East, the κοινὴ ὁδός of

* Ramsay, p. 319.

† Zigana was also a station for troops ('Notit. Dignit. Orient.,' cap. xxxv.).

‡ *Op. cit.*, p. 55. § *Op. cit.*, pp. 69 ff.

Artemidorus. From Melitene a road ran north to Satala, and south in two branches across the Taurus to Samosata, these three points being the *stativa* of the three legions stationed on the upper Euphrates. From Melitene another road led in a north-westerly direction to Sebastea, and from Sebastea another went eastwards to Nicopolis and Satala, from which point it was continued through Armenia Major to Artaxata. From Nicopolis another road ran south to cut into the road Satala—Melitene, according to Kiepert at Analibla, according to Ramsay at Carsagis. From Satala the road from Melitene was prolonged to Trapezus on the Black Sea, which was also a station of Roman troops.

The Roads Melitene—Samosata.

The roads given in the authorities are—

I. Antonine Itinerary: Melitene, XII.; Miasena, XXVIII.; Lacotena, XXVI.; Perre, XXIV.; Samosata.

II. Peutinger Table: Melentenis, VIII.; Corne, XIV.; Metita, XII.; Glaudia, XLVI.; Barsalium, VIII.; Heba, XXX.; Charmodara, XII.; Samosata.

Melitene is at Malatia (Eski Shehr), Samosata at Samsat. Of the sites of the other stations on these two roads very little is known, but we have one fixed point in Perre which is near Adiaman (*vide*, p. 322). Corne, Metita, Claudias * (Glaudia), Barzalo † (Barsalium), Cholmadara (Charmodara) of road II. are placed on the river by Ptolemy, and Laudias (Claudias) and Barzalo are mentioned in a passage of Ammianus Marcellinus (XVIII., 7. 11), in which it is implied that they were forts on the Euphrates. A Greek inscription exists at Gerger, and has been published in Humann and Puchstein's book, from which it appears that the place was called Arsameia in the first century B.C. But, unfortunately, this name does not occur either in the roads of the Tables or in Ptolemy. No milestones have as yet been found in the country which lies between Samosata and Melitene, and the only other piece of positive evidence pointing to the course, taken by either of the two roads which joined the camps, is the great bridge of Kiakhta.

In view of the fact that no one of the stations mentioned in two lists of the Tables is common to both, it seems highly probable that the two roads must have taken wholly divergent routes. Moreover, it appears, from the testimony of Ptolemy and the passage of Ammianus Marcellinus, that road II. kept more or less closely to the river-bank. Hence there is no reason to depart from the arrangement which has been adopted with regard to this road in all the most recent maps of the ancient world, making it follow the course of the river. The precise route taken by the road can only be laid down when further exploration has been carried out along the river above Gerger.

With regard to road I., Ramsay ‡ has suggested that it is probably represented by the modern route by Elemenjik, Khan Bunar, Viran Shehr, and Adiaman. But at the time when his work was published, the existence of a Roman bridge at Kiakhta had only just been made generally known, and if the situation of this bridge, which

* Claudias seems also to be the same as the Claudiopolis of Pliny (V. 24. 85), and Claudiana, a station of the Notitia Dignitatum. It is twice mentioned by Barhebræus ('Hist. Dynast.,' trans. Pococke, pp. 140 and 333). The name seems to have survived into the last century, as Otter ('Voyage en Turquie et Perse,' vol. ii. p. 284) speaks of Arcloudieh as an important fortress near Malatia. However, it is not to be found in the modern maps.

† Barzalo is placed by Ainsworth ('Travels in A. M.,' vol. i. p. 263) at Bersel, a village near Tokariz.

‡ 'Hist. Geogr.,' p. 280.

lies in a direct line between Perre (Adiaman) and Melitene, and the easy nature of the country between Perre and Kiakhta, are taken into consideration, the conclusion seems to be inevitable that road I. must have used the bridge. The distance, too, of the route which he selects for the road, seems to be far too great, if the distances are correctly given in the Itinerary.*

If then, as seems fairly certain, the bridge at Kiakhta belongs to road I., the question remains still to be answered: What route did road I. take over the high Taurus between Kiakhta and Malatia?†

The best authority on the roads across this part of the Taurus is undoubtedly Von Moltke. In 1838 he was stationed with the Turkish army at Malatia, and was in great degree responsible for moving the troops across the mountains from Malatia to the plain of Samsat. He crossed the mountains several times, and must naturally have spared no trouble in obtaining information as to the different passes. He says that there are only three routes practicable for troops,‡ one of these being the waterway of the river, down which he travelled on a raft. The other two are (*a*) the route by Surghu Erkenek and Pelwere, which he describes as practicable for artillery. This route follows, after leaving Malatia, the Sultan Su, a tributary of the Tokhma Su, and is the same as that thought by Ramsay to represent road I.; (*b*) a route along another tributary of the Tokhma Su by Abdul Kharab over high mountains, and practicable only for infantry and cavalry. It is improbable, as has been shown above, that route (*a*) can be the same as the road of the Itinerary, and route (*b*) keeps a long way to the west of the line which we should expect a road using the bridge of Kiakhta to take. It is possible, however, that the Roman road which crossed the Bolam Su at Kiakhta may have followed that stream to its source, which, according to the maps, is close to Abdul Kharab, and from this point to Malatia may have coincided with route (*b*). A further possibility remains that it took a line up the basin of the Gerger Chai to the east of the mountain path which we followed from Kiakhta to Malatia. We were told of the existence of such a route at Kiakhta, but were assured that it was considerably longer than the one by which we travelled—in fact, thirty-two hours as compared with eighteen and a half.

Thus, in the present state of our knowledge of the passes through this part of the Taurus, there is but little evidence to show which one was chosen for road I., and it is probable that the old road has not yet been trodden by any European traveller. It seems not unlikely that it may have kept along the valley of the Bolam Su,

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* The ruins on this road at Viran Shehr (*vide* 'Ainsworth Travels in A. M.,' vol. i. p. 258) correspond well enough in position to the site of Zibatra, an important fortress in late Byzantine times. Its position is fairly accurately defined in the Arab geographers as lying between Malatia, Samsat, and Hisn Mansur (Adiaman), and close to the source of the Jihan (l'Estrange, 'Palestine under the Moslems,' pp. 554 and 562). l'Estrange, however, in his notes on Ibn Serapion, just published in *J.R.A.S.*, 1895, pp. 739 ff., is inclined to adopt a suggestion by Hogarth, that Zibatra might possibly be Derendeh.

† Very strong arguments have been brought together by Hogarth in Macan's new edition of Herodotus, to prove that the Royal Road of Persian days, and subsequently the κοινὴ ὁδὸς of Artemidorus, took a route from Malatia across the Taurus by Kiakhta to Samsat. If this theory holds good, it is highly probable that road I. followed the same route across the mountains.

‡ 'Briefe a. d. Turkei,' p. 316. The value of Moltke's statements, however, is to some slight extent discounted by the fact that in his time Kiakhta and Gerger were occupied by rebellious Kurds. This may have led him to choose routes avoiding these two places.

joining route (*b*) at Abdul Kharab, and thence have followed a tributary * of the Tokhma Su down to Malatia. More than this cannot be said until we are better informed as to the nature of the valley of the Bolam Su.

The Roads north of Melitene.

The whole of the road Melitene—Satala is given in the Antonine Itinerary. It is described as having led *per ripam*.

I*a*. Satala, XVII.; Suissa, XVIII.; Arauracos, XXI*b*.; Carsagis, XXVIII.; Sinervas, XXVIII.; Analiba, XVI.; Zimara, XVI.; Teucila, XXVIII.; Sabus, XVI.; Dascusa, XXXII.; Ciaca, XVIII.; Melitene.

A considerable portion of the same road is given in the Peutinger Table, but it starts from Draconis, the second station from Satala on the direct road Nicopolis —Satala (*vide infra*, II*a*. and II*b*.).

I*b*. Draconis, XVI.; Haris, XVII.; Eregarsina, VIII.; Bubalia, XXVII.; Zimara, XVIII.; Zenocopi, XVIII.; Vereuso, XIII.; Saba, XVIII.; Dascusa, XVIII.; Hispa, XVIII.; Arangas, VIIII.; Ciaca, XXVII.; Melitene.

A direct road, Nicopolis—Satala, is given both in the Itinerary and the Table.

II*a*. In the Antonine Itinerary: Nicopolis, XXIV.; Olotoedariza, XXVI.; Dracontes, XXIV.; Haza, XXVI.; Satala.

II*b*. In the Peutinger Table: Nicopoli, XIV.; Caltiorissa—Draconis, XIII.; Cunissa, X.; Hassis, XIII.; Ziziola, XII.; Satala.

Another road, Nicopolis—Satala, which, if Carsagis is taken to be the same as Carsat, joins road I*a*. at that point, is given in the Itinerary—

II*c*. Nicopoli, XXIV.; Olotoedariza, XXIV.; Carsat, XXIV.; Arauracos, XXIV.; Suissa, XXVI.; Satala.

A road from Nicopolis which cuts into road I*a*. at Analiba and road I*b*. at Zimara, is given in the Peutinger Table.

III. Nicopoli, XXI.; Ole Oberda, XV.; Caleorsissa, XXIII.; Analiba, XV.; Zimara.

The stations on these roads are evidently much confused; Eregarsina of I*b*. is most probably the same as Carsagis and Carsat of I*a*. and II*c*., and the stations Hispa and Arangas of I*b*. are taken from the Melitene—Sebastea road. Probably Hassis of II*b*. = Haris of I*b*., and Dracontes of II*a*. = Draconis of I*b*. and II*b*. Analiba should be changed, as Ramsay has pointed out, to Analibla, in accordance with Ptolemy and 'Acta Conciliorum.'

Melitene, as has been shown already, is at Malatia (Eski Shehr); Satala, now that we have found the legionary tiles, may with certainty be identified with Sadagh, and Nicopolis is at Purk.† In the country through which the roads must have passed, there are only two places which can confidently be considered to be ancient sites. One of these is the place opposite Pingan, from which three

* There is some evidence pointing to the fact that in late Byzantine times there was a road in use along this tributary. The stream may very probably be identified with the Az Zarnuk of the Arab geographers, as its junction with the Tokhma Su (Kubakib) is accurately defined in a passage of Ibn Serapion (translated by l'Estrange, *J.R.A.S.*, 1895, pp. 63 ff.). The Byzantine historians (Ced., 207. 4; Theoph. Cont., 167 B.) record that Basil, in A.D. 872, marched from Ceramisium on this stream (ἐπὶ τῷ Ατζάρνουκ ποταμῷ) to the Euphrates along the road to Melitene. I owe the references to de Muralt, 'Chronographie Byzantine,' p. 453.

† *Vide* Ritter, xviii. p. 214; and J.A.R. Munro in 'R.G.S. Suppl. Papers,' vol. iii. pp. 725 ff.

inscriptions have been published, and where we copied another.* The site is identified by Ramsay with Dascusa on the authority of one of the inscriptions found there, in which Ala II. Ulpia Auriana, according to the Notitia Dignitatum stationed at Dascusa, is mentioned.† But Ramsay, in his map of Cappadocia, assigns a position to Dascusa 50 miles south of the position given to it in his text, and places Zimara in the map, where, according to the text, Dascusa should be. The position given by Ramsay to Zimara is confirmed by the existence of the modern village with the same name, Zimara, very near to the spot at which the inscriptions were found, and just about in the position in which we should be inclined, if working from the Tables, to look for the site. So that if, following the evidence of the inscription, we place Dascusa on the river-bank opposite Pingan, it will be at a spot only about 6 miles distant from the probable site of Zimara. But the Peutinger Table and Itinerary place Dascusa at a point from 60 to 70 miles south of Zimara, and their testimony is supported by a statement of Pliny,‡ who says that Dascusa was 75 miles lower down the river than Zimara. Hence, if the evidence of the inscription is to hold good, it seems necessary to conclude that the station of Dascusa is wrongly placed by the Table, the Itinerary, and Pliny, and has been shifted by these authorities from its real position, which is where the inscription was found opposite Pingan. A minute examination of the literary evidence bearing on these places makes, however, another explanation open to us, by the adoption of which we should do less violence to the authorities. Ptolemy mentions a Δασκοῦσα in conjunction with Zimara in Armenia Minor on the Euphrates, and another place, Δάγουσα, in conjunction with Sinis and Melitene, also on the river, in the στρατηγία of Melitene. A Dagusa is mentioned also by Orosius§ as being situated "in confinio Armeniæ et Cappadociæ," so that there is some evidence in favour of there having been two places on the Euphrates with very similar names, Dascusa and Dagusa. The position of the first of these, as defined by Ptolemy, would fit in very well with the site opposite Pingan; the name is the same as that of the station of the Ala II. Ulpia Auriana, given in the Notitia, and the coincidence of its being joined with Zimara by Ptolemy, and of the preservation of the name Zimara only 6 miles from the spot where the inscription of the Ala was found, is very striking. The position of Dagusa may, then, be found in that of the Dascusa of the Table and Itinerary, and would be, according to the distances which they give and the statement of Pliny, about 70 miles lower down the river. The confusion of two so similar names is so likely to have happened as to require no explanation. On the whole, this theory of there having been two places, Dascusa and Dagusa, on the Euphrates seems to offer the simplest way out of the difficulty, though of course it adds complication to the topography of the district. If it is adopted, the Dascusa, which is placed in Ramsay's map at a point near the junction of the two branches of the Euphrates, must be changed, on the authority of Ptolemy, into Dagusa, and Dascusa must be placed, in accordance with the evidence of the inscription, on the river-bank opposite Pingan. A point in favour of this arrangement is the fact that Zimara is one of the few stations between Melitene and Satala which has no troops assigned to it in the Notitia, and if this

* *Vide* p. 335, note.

† The evidence of the inscription, however, is not conclusive, as it is merely the tombstone of a soldier belonging to this Ala, and it is quite possible that he died while away from his post.

‡ *V.* 24. 84. He says, however, that Zimara is only 12 miles from the source of the Euphrates, so that it is possible that there were two places with this name, as Ritter (vol. x. pp. 822, 823) maintains.

§ I. 2. 23.

theory is adopted, the omission can be explained by the proximity of Dascusa, for the troops there stationed would serve to protect the two posts.

The other site is that seen by Boré* near Melik-Sherif, and identified by Kiepert with Arauraca.

With regard to the other stations on these roads, the only suggestions that we can make are that Dascusa of the Table and Itinerary may have been near Korpanik (see p. 330), that the ruins at Zinika (p. 455) may represent the old Zimara, and that Analibla may have been at Hassan Ova, where we saw some signs of a Byzantine site; but none of these identifications can be made with any degree of certainty.

Two fixed points on the main road on the right bank of the Euphrates are given (1) by the bridge at Korpanik (p. 330); (2) by the bridge over the Kara Budak (Sabrina) (p. 456). Between Malatia and Korpanik the country along the river is easy; and, though we saw no certain traces of any Roman road during this part of our journey, it is highly probable that the old road kept close to the earthy bank, and possible that it has been long ago washed away. Above Korpanik, the country through which the river passes soon becomes mountainous, and from Egin to Pingan the path along the right bank is reported to be most difficult by the natives, and all traffic goes by the route which we followed on the left bank. Hence it seems likely that the Roman road between the bridge at Korpanik and the probable site of Zimara took a line to the west of the route by which we travelled. Taylor,† on his way from Zimara to Arabkir, between Gamkeui and Arabkir, high up on the Sarichichek Dagh, saw a paved road, which he speaks of as being "solidly and ingeniously constructed," and it is not improbable that this may be a portion of the road for which we searched in vain in the river-valley. Moreover, the further west that we place this portion of the road, the more easy it is to understand how Hispa and Arangas—which belong to the Melitene—Sebastea road—were introduced among the stations of road I*b*. in the Peutinger Table.

Beyond the bridge over the Kara Budak, my personal knowledge of the country, through which the road passed in two branches to Nicopolis and Satala, ceases, and I will merely make one criticism of the views advanced by Ramsay as to the course which it took. From the lists of the Table and Itinerary, it appears to be fairly certain that in the district which lies south of Nicopolis and Satala, there was a triangle of roads of which the direct road Nicopolis—Satala was the base. The apex of this triangle is placed by Ramsay at Carsagis, by Kiepert at Analibla. Two sides of the triangle are made by the important roads Nicopolis—Satala and Melitene—Satala, and the third side by the cross-road from Nicopolis to a point in the Melitene-Satala road between Zimara and Satala. Ramsay makes several most ingenious conjectures with regard to the stations Ole-Oberda, Aladaleariza, and Caltiorissa, and makes out what is on paper a very fairly satisfactory restoration of the roads. But in deviating from the view upheld by Kiepert, that road III. struck into the road Melitene—Satala at Analibla, he leaves out of consideration the existence of a natural route which appears to answer very exactly to the requirements of a road from Nicopolis to Zimara. The object in laying out a road from Nicopolis to strike into the Satala—Melitene road would naturally be to make it join the latter at a point in as direct a line as possible between Nicopolis and Melitene; for the road in question cannot have been intended merely to join Satala and Nicopolis, between which points a direct road is given in the Peutinger Table and the Itinerary (II*a*. and II*b*.) This purpose would be best secured by a road going

* Referred to by Ritter, vol. xviii. p. 215.

† *Loc. cit.*, p. 209.

direct from Nicopolis to the probable site of Zimara, near Pingan, and joining the Satala—Melitene road near the bridge over the Kara Budak, in the neighbourhood of which Ramsay and Kiepert agree in placing Analibla. A possible course for such a road is given us in the route travelled by Taylor * from Purk (Nicopolis) to Zimara. This road, which Taylor implies is practicable for wheels as far as the gorge of the upper Armidan or Kuru Chai Su, passes, soon after leaving Purk, at Ashkhar, a Roman milestone, of which he published a copy, and which has been subsequently seen by Messrs. Hogarth and Munro.† From Purk to this point, an old road was observed by him and by the other travellers. Subsequently Taylor crossed the Kara Budak at or very near the spot where we found the remains of the bridge. The milestone at Ashkhar is assigned by Mr. Munro to the road Nicopolis—Sebastea, but it is equally possible that it may have belonged to the road Nicopolis—Zimara—Melitene, which, if it followed Taylor's route, would have joined the Satala—Melitene road near the bridge over the Kara Budak. It is impossible to prove that this route represents the Roman road from Nicopolis, but it seems to be the most likely course to have been chosen for that road. It hits off the bridge over which the main road certainly passed, and there are remains on it which show that for some part of the way a Roman road once went. There is no epigraphical evidence in favour of Ramsay's restoration of this road, and if the position of the bridge over the Kara Budak as regards the line of Taylor's route and the direct and easy nature of the road from Purk to the bridge are taken into consideration, the conclusion seems to be inevitable that Kiepert's restoration of the road is the more probable.

The History of the Lines.

We cannot claim to have discovered much which throws new light on the history of the roads and fortifications of the Euphrates. Unfortunately, the evidence of milestones, which is so abundant on the Cæsarea—Melitene road, and from which the history of this section of the great highway to the East can be written with some degree of certainty, vanishes when the valley of the Euphrates is reached. Along the course of the river from Samosata to Satala only five inscriptions which bear the names of Roman emperors have as yet been found. These are at the bridge of Kiakhta,‡ on a milestone near Melitene (p. 328), at the bridge over the Kara Budak (p. 456), on a milestone near Melik Sherif,§ and at Satala (p. 460, *note*).‖

On account of this dearth of inscriptions, the history of the roads, which have been briefly discussed above, must be written mainly from the very few literary references to this part of the Roman Empire, and the records which we possess of the legions there stationed.

In the reign of Augustus Cappadocia and Commagene were both client states under native princes, and there is no evidence of any regular Roman troops having been posted then on the Euphrates.¶ Tiberius first made Cappadocia a province, and brought Commagene under direct control; but the latter state was given back

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* *Loc. cit.*, pp. 301 ff.

† Munro, *loc. cit.*, p. 727; 'C.I.L.,' vol. iii. p. 6057.

‡ 'C.I.L.,' vol. iii. Suppl. 6709–6714. § 'C.I.L.,' vol. iii. p. 306.

‖ To these may be added the milestone of Trajan, near Purk (p. 465) ('C.I.L.,' vol. iii. 6057), and possibly one of the empress, Julia Domna, which we found at Satala.

¶ Hogarth ('Suppl. Papers of R.G.S.,' vol. iii. p. 710) makes a mistake in saying that, according to Dion Cassius (lv. 23), there were two legions stationed in Cappadocia as early as the time of Augustus. Dion Cassius, in this passage, only gives the stations of the legions in his own day.

to its former rulers under Caligula. The northern districts which lie along and above the western Euphrates as far as Trapezus, were first made Roman probably in 63 A.D.* During the wars of Corbulo it seems probable that Melitene was used as one of the bases of operations for the campaigns beyond the river (Tac., 'Ann.,' xv. 26), but whether a camp was established here as early as this is not certain.† In these wars the two legions, XII. Fulminata and XV. Apollinaris, which, at least from Hadrian's time, were both always stationed in Cappadocia, were first employed in Asia Minor; but at this time they were attached to the army of Corbulo for special duty, and did not belong in any way to Cappadocia, the legate of which had no army in times of peace.‡ Under Corbulo we learn that a fort was established at Ziata,§ near Kharput, on the further side of the Euphrates; but for the establishment of other forts on the nearer bank evidence is wanting.

In the Jewish war under Titus both the twelfth and the fifteenth legions took part, and, after the capture of Jerusalem in 70 A.D., the twelfth was sent to Melitene, but the fifteenth was ordered back to its old quarters in Pannonia.‖

Of Vespasian we are told that he "addidit legiones" to Cappadocia, and gave a legate of consular instead of one of equestrian rank to the province. He also brought Commagene again under direct Roman administration, adding it to the province of Syria. In this province he also raised the number of legions from four to seven; one of these being the new legion, XVI. Flavia Firma, of which we found two inscriptions at Samosata (p. 322). Whether this legion was stationed from the first at Samosata—which was certainly afterwards for some time its head-quarters—is not known, but Mommsen inclines to the view that it was.¶ The milestone near Melik Sherif, and most probably on the line of the Melitene—Satala road, to which allusion has already been made, seems to prove that Vespasian laid out a portion of this road. Its date, if Mommsen's restoration of the inscription is right, is 75 A.D., in which year a Roman garrison is known to have been stationed at Harmozica (Tiflis).** It is thought probable by Mommsen †† that Satala was a station of troops as early as this reign, but, except for the milestone, there is little evidence to support his view. Legio XV. Apollinaris was sent to Pannonia after the Jewish war, and the monuments of its stay there are so abundant that, even if some of them are to be referred to an earlier period, it is most probable that it remained here for a considerable number of years after the war. ‡‡

Thus, while there are no grounds for supposing any military post or road to

* Armenia Minor rather later, but at any rate by 75 A.D. (*vide* Mommsen, 'Provinces,' vol. i. p. 324).

† It is possible that the *ἕρυμα ἐν τετραγώνῳ*, built by the Romans *ἐν τοῖς ἄνω χρόνοις*, may have dated back to this time (Procop., 'De Æd.,' iii. 5).

‡ Tacitus, 'Hist.,' ii. § 1, "Inermes legati regebant nondum additis Cappadociæ legionibus." § 'C.I.L.,' vol. iii. Suppl. 6741-6742.

‖ Josephus, 'Bell. Jud.,' vii. 1. 3; vii. 5. 3.

¶ Dion Cassius (lxviii.) implies that Samosata was not held by the Romans at the time when Trajan arrived there in 109 A.D., so that if the legion was stationed then at Samosata, it must have left its post.

** 'C.I.L.,' vol. iii. 6052. †† 'Provinces,' vol. i. p. 324, note.

‡‡ Mommsen's view, stated in the Provinces *loc. cit.*, is at variance with the conclusions at which he arrived in discussing the history of the Pannonian legions ('C.I.L.,' vol. iii. p. 550). For the inscriptions of this legion at Carnuntum, *vide* 'Arch. Epigr. Oester.,' vol. v. pp. 208 ff. (Hirschfeld); and for a review of the whole question, 'Arch. Epigr. Oester.,' vol. x. pp. 12 ff. (Domaszewski).

have existed on the right bank of the Euphrates previous to Vespasian's reign, we have one piece of positive evidence that the latter laid out a road in Armenia Minor. Seeing also that he re-made Commagene into a province, and strengthened the defences in Cappadocia and Syria, it is probable that the camps, not only at Melitene but also at Samosata, may be attributed to him. And if so, it is more than probable that he would have laid out a road to connect the two posts. Hence it is fair incidentally to suggest that he may have built the original bridge at Kiakhta, which we know, from the inscriptions found by Humann and Puchstein, to have been restored by Septimius Severus. The fact of the existence of an older bridge* tells against the attribution of the southern lines to Septimius Severus, suggested by Hogarth, and, if they are to be attributed to an earlier emperor, there is no one more likely to have laid them out than Vespasian, who first organized the two districts, which are joined by the bridge, for military purposes.

In the reign of Domitian, according to two inscriptions,† roads were constructed in Cappadocia and Armenia Minor, but the district of Armenia Minor is perhaps only mentioned in order to give the full list of the administrative districts under the governor who made the roads, and no definite inference can be drawn from the inscriptions that Domitian planned any of the roads on the frontier. In Trajan's reign a milestone was placed on some road at a point 7 miles from Nicopolis, and may perhaps, as I have tried to show, belong to a road Nicopolis-Zimara, but the evidence is so slight, as compared with that of the roads laid out by Trajan in Galatia and Pontus,‡ that not much stress can be laid on it. It is possible, however, that this road was made by him as a connection between the main system in that region and the frontier-road along the Euphrates. Trajan is also said to have made Melitene a city (Procopius, 'De Æd.,' iii. 5), but this fact does not carry much weight, as a camp most probably existed at this point, according to Procopius's own testimony (*loc. cit.*), before Trajan's time, and Legio XII. was certainly sent here after the Jewish war. Procopius's statement may very likely refer only to some honours conferred on Melitene by Trajan, who must have passed through the place on his march from Samosata to Satala. Whether Legio XV. Apollinaris was stationed at Satala at the time of Trajan's campaign is uncertain. It is supposed by Domaszewski that the legion was not moved from Carnuntum till Hadrian's reign, but no definite evidence as to the date of the change of legions at that camp has as yet come to light. At any rate, by the end of Hadrian's reign this legion had been brought back to the East,§ and seems to have remained till the end of its history at Satala.

Thus it appears that before the middle of the second century the two legions, the twelfth and the fifteenth, were both stationed on the frontier. An Ala Auriana is mentioned by Arrian as having taken part in an expedition against the Alani, and may be the same as the Ala II. Ulpia Auriana of the Notitia, which will thus have been stationed on the Euphrates as early as Hadrian's reign.

With regard to the Legio Prima Pontica, which was stationed at Trapezus,‖

* It is confirmed by the erased inscription which we saw on it (*vide* p. 322).

† 'C.I.L.,' vol. iii. pp. 312–318.

‡ Hogarth, *loc. cit.*, p. 711; Ramsay, 'Hist. Geogr.,' p. 258.

§ It is mentioned by Arrian (100 and 103) as taking part in the expedition against the Alani. (The only inscription which can be approximately dated at Satala is that of Aurelian, *vide* p. 460.) Legio XII. also took part in the expedition.

‖ 'Notit. Dignit. Orient.,' cap. 32.

nothing seems to be known; it does not occur in any of the early lists of legions, and would seem not to have come into existence till the third century A.D., and to have been one of the lesser auxiliary legions.* In the reign of Septimius Severus, as Hogarth has shown, the great road Cæsarea—Melitene was improved on a magnificent scale, but the only evidence for similar improvements due to this emperor along and to the north of the valley of the Euphrates is given by the inscriptions on the great bridge at Kiakhta. Of the later emperors, Decius restored the bridge over the Kara Budak, and there is a milestone, probably the second from Melitene, of the emperors Constans and Constantius, either on the road Melitene—Sebastea or Melitene—Satala. The inscription of Aurelian at Satala need not be any evidence of his having improved that camp, and may be merely an inscription in honour of his great achievements in the East. In still later times, we know that the fortifications at Melitene † and Satala ‡ were repaired by Justinian.

Of the arrangement of the posts and disposition of the troops along the frontier very little is known. Between Samosata and Melitene, Claudiana and Metita are mentioned as posts in the Notitia; Barzalo and Laudias are called *castra præsidiaria* by Ammianus Marcellinus,§ and may be the same as Barsalium, Claudia and Metita of the Peutinger Table. Between Melitene and Satala, along the road of the Antonine Itinerary, seven of the ten stations (all except Carsagis, Sinibra, and Zimara) are assigned troops by the Notitia. ‖ Between Nicopolis and Satala Aladaleariza of the Notitia may be the same as the Olotoedariza of the Table and Itinerary. North of Satala, on the road to Trapezus, Domana and Zigana were both stations of troops. So that an unbroken line of posts at fairly regular intervals must have existed in later times along the river as far as Satala, and been extended northwards to Trapezus.

With regard to the strategical importance of these posts, Samosata and Melitene, two of the three great legionary camps, guarded two important crossing-places of the Euphrates. Barsalium and Claudia, as may be inferred from the passage of Ammianus Marcellinus (*loc. cit.*), probably were chosen with the same object. If Dascusa was situated opposite Pingan, it doubtless protected another crossing-place. The river is narrow at this point, and a bridge could always have been thrown over it with little trouble similar to the wooden bridge now existing there. It is probable that another station was near the crossing at Keban-Maden, but no troops are assigned to the other Dascusa (*vide*, p. 466), which should be near this point. The importance of Satala seems to lie in its position on the route to the East, which was still much used until the middle of this century,¶ and in the advantages which it

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* The name is confirmed by 'C.I.L.,' vol. iii. 306; *vide* also vol. iii. Suppl. 6746; but I do not know that it is otherwise mentioned. In earlier times, possibly the garrison was furnished by the twelfth and fifteenth legions, as inscriptions of both these have been found at Trapezus (*vide* 'C.I.L.,' vol. iii. Suppl. 6745, 6747).

† Procop., 'De Æd.,' iii. 5. ‡ *Ibid.*, iii. 4.

§ XVIII. 7. 11.

‖ 'Notit. Dignit. Orient.,' cap. 32 and 35.

¶ This route goes from the modern Sadagh to Erzerum, and passes Ilija, usually identified with Elegeia. Trajan went from Satala to Elegeia (Dio. Cass., lxviii.). Ilija, it must be remembered, however, is a very common Turkish name for a natural hot spring, and is used in many places all over the Ottoman empire. If its identity here with Elegeia could be proved from other evidence, it would afford an interesting example of the common practice of preserving an ancient name, slightly altered so as to bear a meaning in a modern language.

thus offered as a starting-place for expeditions into Armenia from the north. The fact also that it lies on the natural road from Trapezus to the Euphrates, and was thus open to communications with the sea, may have led to the choice of the site for a legionary camp. The legion stationed here seems to have supplied some of the garrisons in Armenia, for we know that in A.D. 185, a *vexillatio* of the Legio XV., Apollinaris was stationed at Valarschapat (Caenepolis).*

Judging from our experience, it seems probable that very slight remains of the Roman defensive posts along the frontier from Samosata to the Black Sea exist at the present day, and, even though further evidence may be forthcoming in the future, it seems certain that the lines on the eastern frontier were not laid out on nearly the same scale as on the other Roman frontiers, on the Rhine and the Danube, in Britain and in Africa. This is more easily to be explained on the more southern reaches of the Euphrates above Samosata, where the great size and swiftness of the stream, and the inaccessible nature of the mountains through which it flows,† render the river, except at certain easily guarded spots, a formidable barrier to the crossing of an army. But north of Melitene, and especially at and above Keban-Maden, near which the two branches of the Euphrates meet, the river is not so serious an obstacle to an invading force,‡ and it is natural to expect to find remains of defensive works on a large scale near the river-bank. Such remains do not appear to exist at the present day, and the inference may with probability, but not with complete certainty, be made that no great defensive works were ever carried out between the camps. In the same way little care seems to have been bestowed on the connecting roads, and, with the exception of the work of Septimius Severus on the Cæsarea—Melitene road and the bridge which he built at Kiakhta, there is no evidence which points to the roads having been constructed differently to the generality of Roman roads in Asia Minor.§

If we are to seek a reason for this apparent neglect, it is doubtless to be found in the different character of this frontier to that of the other frontiers of the empire. This difference lies in the continual change of relations between Armenia and Rome during the first two centuries of our era. During this period Armenia was hardly ever regarded as a hostile country, and was often reduced nearly to the condition of a Roman province with Roman troops quartered in it. Probably, as Hogarth has pointed out, Septimius Severus was the first to depart from the traditional views of the emperors. He is known to have laid out roads to Melitene from the west and from the south; that he intended to extend these roads to the north as well is not improbable, but the negative results of our journey tend to show that, if ever conceived, this project was not carried out.‖

Before the reading of the paper, the PRESIDENT said: The paper we are to listen to this evening is an account of an expedition under Mr. Hogarth by the upper waters

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* 'C. I. L.,' vol. iii. Suppl. 6052.

† This part of the river is best described by Von Moltke ('Briefe a. d. Turkei,' edit. vi. pp. 308 ff.).

‡ It was easily forded by Taylor in September at a spot near Korpanik (Taylor, *loc. cit.*, p. 315).

§ Ramsay (*op. cit.*, p. 46) describes the usual character of the roads in Asia Minor.

‖ Since this paper has been in the printer's hands, a most valuable article on the campaign of Basil I. against the Paulicians has been published by Mr. J. G. C. Anderson in the *Classical Review* (April, 1896), in which he discusses many of the points of historical geography which are dealt with above. It is most satisfactory to me to find that the conclusions at which he has arrived agree most remarkably with the views expressed in this paper.

of the Euphrates and in the Taurus. Unfortunately he is not at present in England, but Mr. Vincent Yorke, a member of the expedition, has kindly prepared a paper, and will read it to us, and exhibit some interesting photographs; and after his paper Mr. Myres will give a short account of his explorations in the Karian country of Asia Minor.*

After the reading of the paper, the following discussion took place:—

Mr. THEODORE BENT: At this late hour of the evening, after dining and hearing two papers, I feel that you will excuse me if my remarks are rather double, but I should like to ask one or two questions especially upon the paper we have last heard from Mr. Myres. At one time I was much interested in the history of the primitive races which migrated from this part of Asia Minor to Greece, probably by means of the islands as stepping-stones. In these islands there are to be found peculiar little marble figures found in the tombs; these are popularly believed to be Karian, and Herodotus, I believe, called them Karian, and I should like to know if Mr. Myres ever saw any of these marble figures of the female goddess in any tombs. When we were on the sister peninsula of Cnidos we heard rumours of several figures found there, and if they are found at Halicarnassus, it would be a considerable point that the peoples who inhabited the islands of Greece before the Greek period came from this part of Asia Minor, and it would make Herodotus right. With regard to Mr. Yorke's paper, I have been somewhat near the country which Mr. Hogarth and Mr. Yorke explored, and which has been so graphically described to us. The point which struck me more particularly was about the Armenians. The Armenians I have seen were at the Patriarchate of Sis, and there I must say they did not seem in a happy frame of mind. In Russian Armenia they are very far advanced in civilization, but in Turkish Armenia they are quite the reverse. I know nothing about the atrocities, and it is many years since we were there; but at the same time it seems to me that if they had the chance they would be better than the Greeks. In Russia they have had the chance, and the result in several places has proved that they are capable of becoming civilized and a credit to the world in general, which I think is more than can be said about the Armenians of Asia Minor. The country of the Euphrates is certainly one of the most interesting parts of the world, and I am sure we are extremely obliged to Mr. Yorke for giving us so much information about an almost unknown part of the world.

The PRESIDENT: I had no idea Mr. Myres was going to give us so full an account as he has done. I think the papers we have heard this evening fully justify us in having assisted the expeditions of Mr. Hogarth and Mr. Myres. They were also assisted by other societies, but for geography they have produced most valuable results. An important tributary of the Euphrates, before unknown, has now been brought to light, and several other interesting points have been brought out in connection with the positions of the legionary stations at the extreme eastern frontier of the Roman Empire, and the Hogarth expedition has actually discovered the site of one previously unknown, one of the four important frontier stations. These discoveries alone fully justify us in having given our aid to these expeditions, and I am sure that the meeting will instruct me to give its very hearty thanks to Mr. Yorke for the trouble he has taken in preparing the paper describing Mr. Hogarth's expedition, and to Mr. Myres for his most interesting account of his discoveries in Karia, especially in the Peninsula of Myndos. We must not forget to thank Lieut. Green, who accompanied Mr. Hogarth's

* The paper by Mr. Myres will appear in a subsequent number.

expedition, for the extremely valuable mapwork he executed. In your names I return thanks to Mr. Yorke, Mr. Myres, and Lieut. Green.

MR. YORKE'S MAP.—The map of the valley of the Upper Euphrates has been constructed by Mr. F. W. Green. The bearings were taken by prismatic compass, distances estimated by time, and the heights above the sea-level obtained by aneroid. Some of the detail has been added from Captain Maunsell's Survey, 1892, and other sources.

DE MORGAN'S "MISSION SCIENTIFIQUE" TO PERSIA.

By Major-Gen. Sir F. GOLDSMID, C.B., K.C.S.I.

WE have now before us the second volume of the 'Études Géographiques,' or results of the scientific mission to Persia, conducted by M. J. de Morgan, of which the first part was noticed in the *Journal* for August, 1895. The large amount of information which it contains, original and compiled, renders it a valuable reference to those who seek a closer acquaintance with the tracts in North-Western and Western Persia; but it can hardly be said to open out any great extent of new country. Notes of available bibliography—almost identical with those to be found in Curzon's 'Persia'*—disclose at once to us how many older travellers have helped to a due appreciation of that portion of Kurdistan which tacitly admits, if it does not openly proclaim, the sovereignty of the Shah; and it is equally evident that a like attention has been given to non-Kurdish districts.

The geographical limits of the country under exploration are shown under nine heads: (1) The Kurdistan of Mukri; (2) the Kurdistan of Sehna; (3) the Kurdistan of Kirmanshahan; (4) the Province of Hamadan; (5) Malayer and Burujird; (6) Northern Luristan; (7) the Pusht-i-Kuh; (8) Susiana; and (9) the Persian Gulf. For each of these there are subdivisions discussing respectively physical geography, climate, flora and fauna, and population; while for the greater number separate treatment is accorded to towns, villages, and monuments, mineral riches, as also commerce, agriculture, and local industries. Under the Pusht-i-Kuh, or "back of the hill," special notice is taken of ruins. On the other hand, there is no mention made of towns or villages for the Persian Gulf.

M. de Morgan's 'Kurdistan de Moukri,' with which his volume opens, is a comprehensive chapter relating to the country traversed by Mr. Walter Harris, some five years later than the French writer, and described by sketch-map and letterpress in our *Journal* for November last. The actual route taken by the two explorers was not always

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* Twenty-two out of the twenty-three books of reference on Persian Kurdistan, for instance, are the same, and placed in precisely the same order, as those noted by Mr. Curzon.

identical, for Mr. Harris, on leaving Suj-bulak, abandoned the caravan-road for a straight cut across the mountains, so as to visit the Kurds in their summer quarters; but they seem to have been on one and the same track again at Sardasht, Bana (or Bahireh), and Sakiz. Independently of questions of hydrography, orography, and geology, separately grouped, the chapter is rich in illustrative detail, and the author has much to say on the character, language, and customs of the people, which comes under the head of light as well as instructive reading. This description of a marriage at Namashir, in the Balmik district, may be thus rendered in English:

"The bride lived with her parents in a neighbouring village; she had been purchased for the modest sum of twenty *tumáns* (say £8½ to £9½) by an inhabitant of the village in which we were encamped. About five o'clock in the afternoon—when the religious part of the ceremony had been performed—she arrived on horseback, escorted by her own country-folk, and bringing upon a beast of burden two boxes, painted in red, containing her wearing apparel. As soon as the small caravan came in sight, there was a general discharge of firearms; and directly she arrived and had alighted, the bride was conducted to the house of her lord, and the female villagers crowded around her. Much and loud talk ensued among men and women gathered together; then three large coal fires were lighted, and dancing began. The men and women danced in separate groups, holding one another by the waist, whirling round the fires, and adapting their steps to the time of the songs sung by a man placed in the foremost rank of the males, and a woman occupying a like position among the females. The song was slow, with a measured fall, in a monotonous air, often broken in upon by the bursts of laughter of the whole assembly."

Our author endeavoured to obtain some specimens of the words, as strung together for a vocal accompaniment to the dancing on these festal occasions. But, although he was able to collect a certain number, he could not find any that would bear translation. While allowing a high importance to Mukri literature, he regrets that the equivocal taste of its songs and stories is fatal to their publicity in Europe. To the above extract in reference to a wedding, let us add another which relates to a funeral—

"During our stay at the village of Passawa, among the Mamishes, a native of the place, through some unexplained visitation, ceased to show any signs of life. Instantly the air was filled with the lamentations of the whole neighbourhood; the men cried in moderation, but the women and children yelled and shrieked in despair. Although the wretched man thus mourned for was not actually dead, it was not long before he was found to be so in every respect.

"Half an hour after the news of his supposed decease was spread abroad in the village, the male inhabitants took the body to a stream, and, having stripped it of clothes, were about to wash it, when the corpse revived and began to struggle. 'He is possessed with the devil!' they exclaimed; and, struck by a vigorous blow at the back of the head, the victim fell stiff, now no more to rise again. The arrangements for his burial having been completed, the business of the hour was resumed, and the body borne to the cemetery; the whole village followed, weeping and vociferating, as if the practically murdered man had been an object of adoration

to all his fellows. When the grave was closed, the female mourners came and encircled it, continuing their cries and wailings. Then, at a given signal, they suddenly became silent, to resume shortly, in unanimity of cadence, their moan of despair, *wai, wai, wai, wai, wai, wai*, and so on for about an hour. During this time the men, who had accomplished their funeral task, were seated, smoking their *kalians* and discussing their private affairs."

M. de Morgan alludes to the practice of despatching invalids who had grown unconscious as common throughout Kurdistan, and not infrequent in Persia generally. Sometimes, he affirms, the supposed dead man only revives when he has been deposited under the earth. Should his voice at such time be heard, it is said that a great calamity has come upon the country, and every one seeks to escape from the presence, as it were, of an exorcised demon, throwing over the body the largest available stone. Stoning for adultery is mentioned as a national law, but not often put into practice, owing, on the one hand, to the few cases which present themselves, and, on the other, to the difficulty of finding four witnesses to give evidence, a lesser number being insufficient for conviction.

Among the ancient customs of Mukri may also be mentioned the festival of the "sham governor," celebrated at Suj-Bulak in the spring of every year, which is thus described:

"The townspeople appoint a governor (*Amir*), who for three days exercises control, and abandons himself to the eccentricities of the occasion. As soon as this official is installed, he selects his ministers, secretaries, and *Farrash-bashi* (head servant), chooses his body-guard, and proceeds in state, followed by the whole population, to announce to the real governor that he has been deprived of office.

"This festival has often been productive of trouble, for the inhabitants of Suj-Bulak have taken advantage of the occasion to belabour the actual Amir with blows. So that now the sham ruler is always accompanied by soldiers and a government delegate, whose duty it is to prevent the joke being carried too far. For three days the mock rule continues. The governor decides the most absurd cases, and punishes the assumed culprits; but as, in the exaction of penalty inflicted, the dinar ($\frac{1}{100}$ part of a kran) counts for the kran, a fine of one hundred *tumans* (or 10 × 100 krans) is, in reality, that of one kran only. Thus payment is readily made and amusement afforded. The whole procedure is, practically, the 'Carnival of Mukri.'"

There are some noteworthy observations on the mineral riches of the Kurdistan of Kirmanshahan which may be commended to the attention of present and future explorers. Not only do they possess a general interest for the geographical world, but they indicate the existence of a special field of investigation, to turn which to good account no serious effort seems yet to have been made. We are reminded that marble, such as utilized in the wonderful sculptures at Besitun and Tak-i-Bustan, is still abundant in the locality of these monuments. Moreover, the perfect quality of the plaster procurable from the gypsum—the presence of which in the Zohal district and neighbourhood has been certified by

Loftus and others—is cited to show how natural gifts are suffered to lie profitless by a community, whether the governors or the governed, who prefer conventional dwelling-places of bad brick which entail little labour, to solid and durable houses involving abnormal effort. Above all, the reader is enjoined to give heed to the possibilities of a vast and profitable trade in petroleum, of which the aspect of this part of the country amply warrants the anticipation. Our author is of opinion that what he designates a *bande petrolifère*, stretching out in a south-westerly direction from Kerkuk, in Turkish Arabia, to the Persian "Pusht-i-Kuh," may be found the most important source of wealth throughout the whole region. The proximity of Baghdad and the advantages which it offers as a port of embarkation are pointed out, and it is argued that while the naphthas of Baku must pass through the Suez Canal to reach India, those of Zohab might be despatched thither in a direct line that would be of inestimable value in competition. This question is discussed with much useful and careful detail.

Amid the problems treated in the Kirmanshahan chapter, M. de Morgan discusses the better means of developing traffic between the tablelands of Persia and the Persian Gulf, but he himself supports the ambitious proposal of connecting Tehran by rail with Baghdad. His opinion on the feasibility of this connection is, no doubt, worthy of attention. Moreover, Constantinople to Baghdad, and Baghdad to Tehran, are combinations not only desirable, but likely, as main lines of railway in the future. One stated objection to the fulfilment of his project, in the fact that the city of the khalifs is out of Persia, he considers unimportant, because of the good understanding (*très bonnes relations*) which exists between Shah and Sultan. But we are rather inclined to accept his view on other grounds. Throughout the length of the Turko-Persian frontier, the hostility between the Sunni and Shiah on either side is proverbial; nor is this feeling less marked between Kirmanshah and Baghdad than elsewhere. Some years ago, when the Turkish iron poles of the Indo-European telegraph were about to join the Persian wooden poles across a tract of disputed territory, so great was the international jealousy, and fear of ceding a yard of doubtful land, that proceedings were summarily stopped. Her Majesty's Resident and Consul-General at Baghdad fortunately hit upon the happy expedient of using iron and wooden poles alternately over the whole tract under litigation, or the junction of the wires might have remained a *fait non-accompli* to the present day.

Space will not admit of extracts from other than the two first chapters, but all are worth reading and remembering, in connection with the geographical study of the western side of Persia. Illustrations abound in this handsome volume: these are, for the most part, good and helpful to the due comprehension of the text; some are especially attractive and artistic. Had we to select the more excellent, we might

point to the Lake Gohar, situated in the narrow valley south of Ushtaran Kuh, in Northern Luristan, and three of the many views of the Ushtaran Kuh itself. The Tang-Azna, in the country of the Lurs of Sagwand, is a charming photograph.

SOME BOOKS ON EAST AND SOUTH AFRICA.

THE first book on our list* supplies a welcome exception to the general applicability of the statement, so often made, that the work of British explorers falls far short of that of the Germans in permanent scientific value. In this respect it may rank with the best German publications that have appeared in recent years. Although primarily a geologist, Dr. Gregory has given much attention to other branches of natural science, and his conclusions with regard to the various scientific questions touched upon are the result of long and careful study. The plan of his book is that followed by many German writers, the account of the journey itself being followed by chapters dealing with the various scientific aspects of the country.

The general results of Dr. Gregory's journey were fully given in the series of articles published in the *Journal* in 1894 (vol. iv.). The most striking features of the country dealt with are the Great Rift Valley, which gives the book its name, and Mount Kenya, on which so much new light was thrown by the journey. To non-geologists the term "rift valley" may be apt to suggest an exaggerated idea of depth and narrowness, the height of the walls being after all very slight compared with the width of the floor. It would not be easy, however, to suggest a better. Dr. Gregory followed its eastern side through two degrees of latitude, besides crossing its floor near Lake Baringo. The illustration at p. 94 gives a good idea of the level nature of the floor and the sudden rise of the bounding walls.† It may be remarked that the results of Dr. Donaldson Smith's journey hardly bear out the idea of its prolongation as a marked line of depression north-east of Lake Rudolf, while it is not quite clear, from the allusion to Lake Nyasa as in the *eastern* branch of the valley, whether the author rejects the notion that the western trough is indicated south of Tanganyika by the furrow of the Songwe and Saisi valleys.

The account of Dr. Gregory's adventures in the romantic region of snow-fields and glaciers around the central peak of Kenya is of extreme interest, and will, it is to be hoped, induce others to follow in his steps. Kenya appeals more to the imagination than Kilimanjaro, whose

* 'The Great Rift Valley.' By J. W. Gregory. London: Murray. 1896.

† The illustration (after Giraud) intended to show the steep sides of the narrow type of lakes, is accidentally referred to Tanganyika instead of Nyasa. Another slip is the statement that only one of the lakes has an outlet to the sea.

massive simplicity is more easily taken in; the various peaks and toothed pinnacles of Kenya, separated by upland valleys, show a more complicated general structure. The route followed is not marked on the sketch-map, but the names given to the chief features are an assistance in tracing it. Dr. Gregory does not appear to have named the striking rock-pinnacle, which rises above the moraines of the Lewis glacier, and which might readily be mistaken for the highest summit, though a comparison with the map and the other views shows that it is not. Though lacking the precision of photographs, the views alluded to give a vivid general idea of the features of the great mountain.

An interesting chapter deals with problems connected with the distribution of the flora and fauna, on which new light has been thrown by the discovery of moraines on Kenya at a much lower level than is reached by the present glaciers. In his division of the country into botanic zones, Dr. Gregory has introduced a slight modification since publishing his paper in the *Journal*. He defines a somewhat greater number than Mr. Scott-Elliot, but does not discriminate so minutely as Prof. Engler, whose eight floral zones, laid down for Usambara, do not include the higher mountains. The high mountain forests of Usambara correspond, according to Dr. Gregory, with the mountain forest which clothes the lower slopes of the main peaks.* We cannot do more than refer to the section dealing with the native tribes, which gives, perhaps, the best summary of our present knowledge which exists in English. Special attention is paid to the history of tribal migrations, and the main war-paths of the Masai are shown on one of the accompanying sketch-maps.

Mr Chanler's volume † takes the form of a detailed narrative of the events connected with his expedition to the north-east of Mount Kenya, in conjunction with Lieut. von Höhnel. Although the difficulties encountered caused a partial failure of the original plan, enough new ground was broken to give a considerable value to the results attained, a previously unknown area of over 100 miles in each direction being carefully mapped. The excellence of the former surveys of von Höhnel, on whom this work devolved, is a voucher for the trustworthiness of the map, which is on the large scale of 1 : 750,000. The colouring, according to contours of altitude—though the data available can hardly admit of great exactitude—no doubt gives a good general idea of the relief of the country. The chief geographical discovery was the tracing of the river Guaso Nyiro through the greater part of its course to the Lorian swamp, the position of which was thus for the first time defined. Much

* In the case of Kenya the forest zone is almost at the base, owing to the height of the plateau on which the mountain is placed; but on Kilimanjaro it begins only at a considerable height.

† 'Through Jungle and Desert.' By William Astor Chanler. London and New York: Macmillan. 1896.

new information was collected regarding the tribes met with, especially the Rendile, a race of doubtful affinity, but probably allied to the Gallas and Somalis, who own large herds of camels. The failure to obtain transport animals from them was largely responsible for the curtailment of the route.

On several occasions fights occurred, and in this respect the expedition compares unfavourably with Dr. Gregory's, which succeeded in maintaining friendly relations with the natives in spite of its small numbers. Mr. Chanler holds that the first intercourse of Europeans with new tribes is bound to involve bloodshed, and was, perhaps, not so determined to avoid it as some travellers have been without ill result. The difficulties encountered were, however, undoubtedly great. He apparently lacks the sympathetic feeling towards the Zanzibaris * which Dr. Gregory displays in spite of a consciousness of their many faults, and this may partly account for, without excusing, the desertion of his men after von Höhnel's departure for the coast, dangerously wounded by a rhinoceros. These animals seem to have been particularly plentiful and troublesome. The numerous and characteristic cuts are from photographs by the author, and, being evidently faithful copies, are a welcome change from the process-reproductions now almost universal in books of travel.

Before proceeding to books on South Africa, we may notice that the second volume of Dr. Paulitschke's 'Ethnographie Nordost Afrikas' has now been published. It deals in a thorough and comprehensive way with the moral culture of the Danakil, Galla, and Somal tribes, the first volume (noticed in the *Journal*, vol. iii. p. 503) having been concerned with their "material culture."

There is, perhaps, no part of the continent about which so many misconceptions prevail as German South-West Africa, the numerous works already published with reference to it having often been too scientific for popular comprehension. The connected account of the colony † which Lieut. H. von François—not to be confounded with his brother, Major C. von François—has prepared in a form suitable for general use, is therefore likely to prove serviceable in giving a clear conception of the present state and capabilities of the country. As the writer has served there for a considerable time, he has had good opportunities of becoming well acquainted with it personally. The book begins with a general description of the physical geography, plant and animal life, etc., followed by a sketch of the native inhabitants. Having thus given an idea of the material to be worked upon in the development of

* The Zanzibaris, Mr. Chanler thinks, are perfectly satisfied with their present condition of serfdom, and he doubts whether they would be benefited by a change.

† 'Nama und Damara, Deutsch-Süd-West-Afrika.' Von H. von François. Magdeburg: Baensch. [1896.]

the country, the author proceeds to relate the chief events connected with the German occupation (some space being devoted to the relations of the government with Hendrik Witbooi), and describes the various industries practised, concluding with a forecast for the future. Of the native population the Hill Damaras and the "Bastards" will probably prove most valuable allies in the work to be done. Political relations with the Hottentots will always be on a somewhat doubtful basis. British merchants and others still form a large proportion of the white population, and Boers are present in some numbers. Although the latter give little trouble, the author sees a danger in the possible preponderance of the Dutch element, and insists on the need of a larger number of German settlers, as well as of improved internal communications and a direct line of steamers to Germany. Want of practical experience at present puts the German immigrants at a disadvantage. The book is well and abundantly illustrated.

Prof. Wallace's book* is a valuable addition to our knowledge of the economic resources of the Cape, and must deeply interest all who are concerned in the welfare of that colony. The information it contains was acquired at first hand during journeys through the length and breadth of the country, carried out in 1895 at the request of the Cape Government, which gave constant opportunities of intercourse with the farmers themselves. Although much of the book naturally deals with more or less technical subjects, it is also most instructive from a geographical point of view, enabling the reader to grasp clearly the general surface features and their effect on the plant and animal life of the colony.

The series of maps by Bartholomew, which are excellent specimens of cartography, is a valuable feature of the work. The orographical features are shown in a two-sheet map of the scale of 1 : 2,500,000, coloured according to contours of altitude at every 1000 feet up to 4000, and at every 2000 feet above that height. Another map shows, under the title "Land surface features," the prevailing forms of vegetation, with the limited areas in which agriculture is practised.† Others give the proportions of the different kinds of stock in different localities, and a useful set of meteorological maps concludes the series. One of the most interesting chapters is that on ostrich-farming. The total number of birds now exceeds a quarter of a million. Fruit-growing, for which the climate is particularly favourable, is unaccountably neglected, and enterprise and skill are much needed to show what might be done in this direction.

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* 'Farming Industries of Cape Colony.' By Robert Wallace, F.L.S., etc. London: King. 1896.

† The tints of this map do not in every case agree with those of the reference at the side. Thus the thorn-bush is green in the latter, but a light-brown in the former, apparently owing to the omission of a component tint.

GEOGRAPHY AT THE BRITISH ASSOCIATION, LIVERPOOL, 1896.

THE meeting of the British Association at Liverpool, from September 18 to 23, 1896, was the largest and most successful of recent years. The total number of tickets issued, amounting to 3180, has only twice been exceeded—at Newcastle in 1863, and at Manchester in 1887. If it were possible to distinguish the Liverpool meeting from all others by any one feature, that would be the convenient and even magnificent housing of the Association as a whole and all the sections. Section E certainly fared the best of all, for the "Small Concert Hall," in the same building with the great St. George's Hall, which served as the reception-room, was allotted to it. The hall is circular, of large dimensions, seating comfortably about a thousand people; it has just been redecorated, and was effectually darkened to admit of the use of the lantern. The attendance at the meetings of the section was very large, and much more uniform than usual. Very few papers were read to a small audience, and the number of communications sent in was so great (thirty-four) that a meeting had to be held on Saturday forenoon, in addition to the four days which usually suffice.

The Organizing Committee had arranged the papers of which intimation had been given in such a way that similar subjects were kept together; but the failure of some authors to put in an appearance, the changing of dates, which had been fixed to suit themselves, by others, and the presentation of valuable communications at short notice by gentlemen who could only attend on particular days, broke down the prepared order, and made the proceedings of each day too varied to be altogether profitable. It must, however, be recognized that the papers submitted were in themselves of great interest and value, and many of them afforded satisfactory proof of the sound study of geography as a science, and not as the mere record of explorations. But in exploration the story of some splendid successes was told, and an unexampled collection of the finest lantern-slides brought the scenery of many distant parts of the world vividly before most appreciative audiences. The large diagram maps of the Royal Geographical Society were as usual lent to the section.

The constitution of the section was as follows, the names of those nominated as vice-presidents or members of Committee who were disqualified by absence from the meeting or by not becoming *members* of the Association being omitted:—

President:—Major L. Darwin, Hon. Sec. R.G.S.; *Vice-Presidents*:—John Coles, F.R.A.S.; Admiral Sir Erasmus Ommanney, C.B., F.R.S.; Lieut.-Col. Sir Lambert Playfair, K.C.M.G.; P. L. Sclater, F.R.S.; E. G. Ravenstein; Coutts Trotter; Horace Walker. *Secretaries*:—Lieut.-Col. F. Bailey, Sec. R.S.G.S.; H. N. Dickson, F.R.S.E.; H. R. Mill, D.SC.

(*Recorder*); Commander E. Dubois Phillips, R.N. *Committee*:—J. Bolton; A. Montefiore Brice; G. G. Chisholm, M.A., B.SC.; Sir W. Martin Conway; Vaughan Cornish, M.SC.; H. T. Crook; B. V. Darbishire, M.A.; Chas. Gatehouse; E. Heawood, M.A.; A. J. Herbertson; Rev. J. F. Heyes, M.A.; J. Scott Keltie, Sec. R.G.S.; Prof. J. Milne, F.R.S.; Count Pfeil; George Philip, Jun.; Ralph Richardson; Eli Sowerbutts; Major-Gen. Sir Charles Wilson, R.E., K.C.B., F.R.S.

Thursday, September 19.—The address of the President (p. 488) was listened to with close attention by a large audience, and on its conclusion Count Pfeil proposed a vote of thanks, which was seconded by Sir Charles Wilson and heartily carried.

Mr. H. S. Cowper gave a preliminary account of his journey in March, 1896, through Northern Tripoli, a continuation of his work published in the *Geographical Journal*, vol. vii., 1896, p. 150, which it is hoped will shortly be submitted in full to the Society. The Rev. C. J. Robinson gave an account of his travels in the Hausa country.

Mr. John Coles explained the methods of photographic surveying, exhibiting two different types of camera adapted for such work, and expressing his belief that photographic methods in surveying were destined soon to take a very prominent place.

Mr. H. N. Dickson stated the present position of his research on the chemical composition and circulation of the water of the North Atlantic, specimens having been collected for him by the observers of the Meteorological Office and other sea-captains. Prof. Hjort, of Christiania, referred to the admirable oceanographical work being carried on by the Norwegian Government.

Dr. H. R. Mill explained his scheme for a geographical description of the British Islands, based on the 1-inch maps of the Ordnance Survey, and invited discussion on it. Mr. H. T. Crook criticized the Ordnance maps, complaining that they did not give as much information as they should do, and stating that if they were properly constructed no written description would be necessary. Prof. Hull pointed out that the Ordnance maps, with geological colouring superimposed, were as full as any maps could be made; and Mr. Coles paid a high tribute to the great beauty and accuracy of the British maps as compared with the state maps of any country in the world.

Friday, September 18.—The Rev. W. K. R. Bedford described the old tapestry maps of parts of England, woven during the latter part of the sixteenth century, specimens of which are preserved at York and in the Bodleian Library at Oxford. They showed several features of the topography of the counties represented which do not seem to have been shown on any of the published maps of the period.

Dr. Tempest Anderson showed photographs of the Altels avalanche of September, 1895, in which a mass, partly snow, partly glacier ice, swept for 4000 feet down the mountain-side, causing great destruction.

The fracture afforded an interesting glimpse of the internal structure of a glacier far from its termination.

Lieut. G. Vandeleur, of the Scots Guards, gave a preliminary statement of his observations in Uganda and on the Upper Nile, which will shortly be presented in full to the Royal Geographical Society.

Dr. F. P. Gulliver, of Harvard College, discussed the form of the coast-line of Romney Marsh, and described the origin of Dungeness. His paper will probably be published with diagrams in the *Journal*.

Mr. A. Montefiore Brice, secretary to the Jackson-Harmsworth Arctic Expedition, gave an address to a crowded house on the second year's work of the expedition, illustrated by slides, showing the life of the expedition and the scenery of Franz Josef Land. Sir Erasmus Ommanney, Sir Martin Conway, and Mr. Coles, expressed the feeling of the meeting as to the valuable work which had been done. It will be fully recorded in the *Journal*.

Mr. G. F. Scott Elliot communicated a paper on the influence of climate and vegetation on African civilization, an abstract of which appears in the Monthly Record. It gave rise to a brief discussion.

Mr. Vaughan Cornish contributed the results of a valuable original investigation on the forms, origin, and distribution of sand-dunes and sand-banks, which we hope to publish in full, with diagrams, at an early date.

Saturday, September 19.—Mr. A. J. Herbertson exhibited a series of monthly mean rainfall maps of the world, which, in conjunction with Dr. A. Buchan, he has prepared for the great physical atlas now being compiled by Mr. Bartholomew, on the basis of Berghaus. These maps are the first of their kind to be made, and are full of interest from the point of view of climatology.

Mr. Ravenstein presented the report of the Committee on the Climatology of Tropical Africa (Secretary, Mr. H. N. Dickson), the text of which is given in the Monthly Record.

Mr. J. Howard Reed sent in a paper describing the efforts of the Manchester Geographical Society in the popularization of geographical education.

The feature of the day was an eloquent address on Canada and its gold-resources by Sir James Grant, K.C.M.G., which was warmly received. He said that Canada contained both coal and gold, and within the last few years remarkable discoveries had been made. In Nova Scotia the coal area covered 635 square miles. In New Brunswick it was estimated that there were upwards of 150,000,000 tons of coal; while in the north-west territory Dr. Dawson had arrived, after careful investigation, at the fact that there were over 50,000 square miles of coal-bearing strata. It was a remarkable fact that the Dominion had coal on the Atlantic and Pacific seaboards and in the interior—as if nature had intended to supply it with the requisite material in the

event of an emergency to send its ships to any part of the world, and thus contribute materially to the strengthening of the Empire. With reference to gold, discoveries were made in Nova Scotia in 1860, and since 1885 the mines in the province had become exceedingly lucrative, owing to the utilization of appliances for the recovery of gold from low-grade ores. It was estimated that that province had produced gold to the value of $11,500,000. In the province of Quebec Prof. Hardman made some investigations. After running a tunnel 600 feet in length, he struck the bed of an old river, and in three weeks removed enough gold to pay the entire expense of his operations. The consequence was that to-day there was feverish excitement in the province, and every acre of land was being taken up. In Ontario the discoveries had been of a remarkable character. At Manatou there were numerous seams in which the gold appeared on the surface, and could be removed with the greatest ease. This district was only 100 miles distant from Winnipeg and 40 miles from the Pacific Railway. In British Columbia 400 miners in one day took from Williams Creek 200 lbs. weight of gold, and he predicted that the future output in this province would surprise not only Canadians, but the whole of the civilized world.

Monday, September 21.—Mr. W. A. L. Fletcher, who accompanied Mr. and Mrs. St. George Littledale on their great journey across Tibet from north to south, gave an account of his journey toward Lhasa; and our readers, who have already had an opportunity of knowing the facts of this journey, will be pleased to learn that Mrs. Littledale has recovered from the results of the hardships she underwent, and was present at the reading of the paper.

Iceland was the subject of two short papers, both illustrated by very fine slides of scenery. Mr. Frederick W. Howell described his journey through the glacier-region of Northern Iceland, and Dr. K. Grossman spoke of the volcanic scenery surrounding Hecla.

Mr. G. G. Chisholm treated of the Relativity of geographical advantages in an able paper, for the adequate discussion of which there was, unfortunately, no time. He considered geographical advantages: (1) as relative to the condition of the surface of a country, *e.g.* the extent of forests, marshes, etc. The former and present relative importance of Liverpool and Bristol might be explained, in part at least, by changes that had taken place under this head. Also the difference in direction by some of the great Roman roads and those of the present day, and the consequent fact that some important Roman stations in Britain were not now represented even by a hamlet. (2) As relative to the political condition of a country and of other countries. (3) As relative to the state of military science. Under these two heads the difference in the situation of the Roman wall between Tyne and Solway and the Anglo-Scottish boundary suggested some considerations. Also

the difference in the situation of some important Roman towns or stations and their modern representatives (Uriconium, Shrewsbury; Sorbiodunum, Salisbury). (4) As relative to the state of applied science—well illustrated in this country, in the history of the iron and textile industries. (5) As relative to the density of population—another important consideration in the industrial history of our own country. (6) As relative to the mental attitude of the people where the geographical advantages existed. Many Chinese travellers and students of China had recognized the excessive reverence for ancestors in that country as one great hindrance in the way of turning the advantages of the country to account.

Mr. Ralph Richardson read a paper on the boundary of British Guiana and Schomburgk's line, which called forth a very lively discussion, but did not reach any definite conclusion.

In the afternoon Sir W. Martin Conway gave a preliminary account of the expedition to Spitzbergen which he, together with Dr. J. W. Gregory, Messrs. Garwood, Trevor-Battye, and H. Conway, made in the summer of 1896. He vividly described the difficulties in the way of land travel presented by soft snow and interminable marshes which he had successfully overcome in crossing the south-western island.

Mr. J. Ferguson, in the absence of Mr. H. W. Cave, exhibited a fine series of photographs of the ancient ruined cities of Ceylon, which were taken by Mr. Cave to serve as illustrations for a forthcoming work on the subject.

Prof. J. Milne, F.R.S., discoursed on earthquakes and sea-waves. During the whole day the audience in the section had been large, and highly appreciative of the papers submitted to them.

Tuesday, September 22.—Mr. A. E. Fitz Gerald gave a short account of his mountaineering journey across the Southern Alps of New Zealand, and announced his intended departure for an expedition of some magnitude to the Chilian Andes, in the course of which it is his intention to attempt the ascent of Aconcagua.

Sir Charles W. Wilson was listened to with the deepest attention while he gave an address on the Egyptian Sudan, a report of which, it is hoped, will appear in the *Journal*, and after he concluded, a number of questions were asked as to the prospects of trade by the different routes proposed to the interior.

Mr. A. W. Andrews read a practical paper on the teaching of geography in relation to history, and his arguments will appear later in the *Journal*.

Mr. E. Odlum, of Vancouver, described the border zone between British Columbia and Alaska, referring especially to the region under consideration in the present boundary negotiations. Sir Charles Wilson, as the surveyor responsible for fixing the 49th parallel, the boundary between Western Canada and the United States, and Mr. John Coles as

the first settler in British Columbia, congratulated Mr. Odlum on his paper.

Mr. J. Scott Keltie, who had just returned from Christiania, gave an account of the triumphal reception of Dr. Nansen, and a sketch of the achievements of the great Arctic expedition. He read extracts from an article by Professor Mohn (see the October number of the *Journal*), who expressed the highest possible delight and admiration at the scientific results of the observations, especially those on meteorology and terrestrial magnetism. Sir Erasmus Ommanney and Mr. Coles spoke of the unique value of Nansen's work.

Mr. A. J. Herbertson demonstrated the use of a simple arrangement for explaining the principle of map-projections. It consists of a hemisphere made up of wire meridians and parallels, the shadow of which is thrown on a sheet of paper by means of a candle sliding along a graduated bar. The nature of the projection, of course, varies with the position of the candle.

Mr. B. V. Darbishire showed a new population map of the South Wales coal-district. It gave the position of all detached inhabited houses as well as the villages and towns, and having the contour-lines of elevation, it brought out the relation of population to land-form.

Mr. A. J. Herbertson read the interim-report of the Committee on Geographical Teaching, in which he stated that he had collected a large amount of material; but the Committee, having been unable to obtain access to some important returns, wished to delay the full report until next year, when it could be presented in its entirety.

Mr. Coutts-Trotter proposed, and Mr. Eli Sowerbutts seconded, a vote of thanks to the president (Major Darwin), the vice-presidents who had assisted him in the chair (Messrs. John Coles and Horace Walker), the secretaries of the Section, and the local secretaries for the admirable hall provided.

Papers of geographical interest were as usual read in many sections besides that specially devoted to geography. In Section A (Mathematics and Physics), Dr. L. A. Bauer discussed some problems in terrestrial magnetism, Mr. H. M. Taylor read a paper on great-circle sailing, and reports were submitted by the Committees on seismological observations and on meteorological photographs. In Section C (Geology), Mr. Man's presidential address abounded in allusions to results of physical geography, and much interest was aroused in a series of papers on ocean depth and deposits, introduced by Mr. E. B. Wethered, on the depths of the sea in past epochs. Mr. T. Mellard Reade discussed the oscillations in the level of the land near Liverpool from geological evidence, and Mr. G. H. Morton spoke of the erosion of the sea-coast of Wirral, the tongue-shaped peninsula between the Mersey and the Dee.

In Section D (Zoology), the president, Professor Poulton, reviewed the evidence regarding the age of the Earth from the physical as well

as the biological point of view, and contended for a great extension of its habitable period beyond that usually conceded by physicists. A report was read on the biological investigation of oceanic islands; and in Section H (Anthropology), Prof. Haddon called attention to the need of the immediate study of such islands from the anthropological point of view. In the latter section, the president, Mr. A. Evans, spoke on the pre-historic migrations of people and the origin of European races; and Mr. J. L. Myres read a paper on "Cyprus and the Trade-routes of South-Eastern Europe." Mr. Thiselton Dyer, Director of the Royal Gardens at Kew, gave a lecture in Section K (Botany) on the geographical distribution of plants. Section G (Mechanical Science and Engineering) listened to two communications of much geographical interest, one a "Report on the Effect of Wind and Atmospheric Pressure on Tides;" the other by Mr. G. F. Lyster, on "The Physical and Engineering Features of the River Mersey and the Port of Liverpool." Mr. Lyster's paper was felt to be of such value that it was ordered by the General Committee to be printed in full in the Report.

Prof. W. A. Herdman, in addition to his arduous duties as local secretary, has edited the Association's "Handbook to Liverpool," which, although smaller than some similar books in the past, is admirably compiled, and will serve as a valuable scientific guide to the Liverpool neighbourhood for years to come. It contains the following chapters: History and Antiquity of Liverpool, by W. H. Picton; Geology of the Country around Liverpool, by G. H. Morton, with a geological map specially compiled; The Vertebrate Fauna of the Liverpool District, by Dr. H. O. Forbes; The Marine Fauna of the District, by Prof. Herdman; The Entomology of the Liverpool District, by W. E. Sharp; The Botany of the Liverpool District, by Robert Brown; The Climate of Liverpool, by W. E. Plummer; The River and the Tides, by Prof. Oliver J. Lodge; Docks, and other Engineering Works, by Prof. H. S. Hele-Shaw and H. Percy Boulnois; Trade and Commerce of Liverpool, by Sir William B. Forwood; Chemical Industries, by Dr. C. A. Kohn. An appendix is added giving some similar particulars relating to the Isle of Man, the scene of one of the largest excursions of members after the close of the meeting.

RAILWAYS IN AFRICA.*

By Major DARWIN, Sec. R.G.S.

In reviewing the record of geographical work during the past year, all other performances pale in comparison with the feat accomplished by Nansen. It is not merely that he has gone considerably nearer the North Pole than any other explorer, it is not only that he has made one of the most courageous expeditions

* Address delivered to the Geographical Section of the British Association at Liverpool, September 17, 1896, by Major Darwin, as President of the Section. Map, p. 540.

ever recorded, but he has established the truth of his theory of Polar currents, and has brought back a mass of valuable scientific information. When Nansen comes to England, I am certain that we shall give him a reception which will prove how much we admire the heroism of this brave Norwegian.

Besides the news of this most remarkable achievement, the results of a considerable amount of useful exploratory work have been published since the British Association met last at Ipswich. With regard to other Arctic expeditions, we have had the account of Lieutenant Peary's third season in Northern Greenland, from which place he came back in September last, and to which he has again returned, though without the intention of passing another winter there. In October the *Windward* brought home more ample information as to the progress of the Jackson-Harmsworth Expedition than that communicated by telegram to the Association at Ipswich, and on her return from her remarkably rapid voyage this summer she brought back the record of another year. As to geographical work in Asia, Mr. and Mrs. Littledale returned safely from their explorations of the little-known parts of Tibet; the Pamir Boundary Commission, under Colonel Holdich, has collected a great deal of accurate topographical information in the course of its labours; Dr. Sven Hedin continues his important researches in Turkestan; and the Royal Geographical Society was glad to welcome Prince Henry of Orleans when he came to tell us about his journey near the sources of the Irrawaddy. As to Africa, the most important additions to our knowledge of that continent are due to the French surveyors, who have accurately mapped the recently discovered series of lakes in the neighbourhood of Timbuktu, Lake Faguibine, the largest, being found to be 68 miles in length; Dr. Donaldson Smith has filled up some large blanks in the map of Somaliland; and Mr. and Mrs. Theodore Bent have investigated some interesting remains of ancient gold workings inland of the Red Sea. In other parts of the world less has been done, because there is less to do. Mr. Fitz Gerald has proved for the first time the practicable character of a pass across the Southern Alps, thus supplementing the excellent work of Mr. Harper and other pioneers of the New Zealand Alpine Club; and Sir W. M. Conway has commenced a systematic exploration of the interior of Spitzbergen, a region to which the attention of several other geographers is also directed.

It is impossible in such a brief sketch to enumerate even the leading events of the geographical year, but what I have said is enough to remind us of the great amount of valuable and useful work which is being done in many quarters of the world. It is true that if we compare this record with the record of years gone by, we find a marked difference. Then, there was always some great geographical problem to be attacked; the sources of the Nile had to be discovered; the course of the Niger had to be traced; and the great white patches on our maps stimulated the imagination of explorers with the thought of all sorts of possibilities. Now, though there is much to be learned, yet, with the exception of the Poles, the work will consist in filling in the details of the picture, the general outlines being all drawn for us already. Personally I cannot help feeling a completely unreasoning regret that we have almost passed out of the heroic period of geography. Whatever the future may have in store for us, it can never give us another Columbus, another Magellan, or another Livingstone. The geographical discoverers of the future will win their fame in a more prosaic fashion, though their work may in reality be of even greater service to mankind. There are now few places in the world where the outline of the main topographical features is unknown; but, on the other hand, there are vast districts not yet thoroughly examined. And, in examining these more or less known localities, geographers must take a far wider view than heretofore of their methods of study in order to accommodate themselves to modern conditions.

But even if we confine our attention to the older and more narrow field of geography, it will be seen that there is still an immense amount of work to be done. We have been filling in the map of Africa during recent years with extraordinary rapidity, but yet that map is likely to remain in a very unsatisfactory condition for a long time to come. Englishmen and other Europeans have always shown themselves to be ready to risk their lives in exploring unknown regions, but we have yet to see how readily they will undertake the plodding work of recording topographical details when little renown is to be won by their efforts. It should be one of the objects of geographical societies to educate the public to recognize the importance of this work, and General Chapman deserves great credit for bringing the matter before the International Congress last year in such a prominent manner. He confined himself to four main recommendations. (1) The extension of accurate topographical surveys in regions likely to be settled by Europeans. (2) The encouragement of travellers to sketch areas rather than routes. (3) The study of astronomical observations already taken in the unsurveyed parts of Africa in a systematic manner, and the publication of the results. (4) The accurate determination of the latitude and longitude of many important places in unsurveyed Africa. I am certain that all geographers are in hearty accord with General Chapman in his views, and it is, perhaps, by continually bringing this matter before the public that we shall best help this movement forward.

Not only do we want a more accurate filling in of the picture, but we have yet to learn to read its lessons aright. The past cannot be understood, and still less can the future be predicted, without a wider conception of geographical facts. Look, for example, at the European colonies on the West Coast of Africa. Here we find that there have been Portuguese settlements on the Gold Coast since the year 1471, the French possibly having been established there at an even earlier date; whilst we English, who pride ourselves on our go-ahead character, have had trading factories on the coast since 1667. I have here a map showing the state of our geographical knowledge in 1815. Why was it that Europeans have never, broadly speaking, pushed into the interior from their base on the coast, which they had occupied for so many centuries? That they had not done so, at least to any purpose, is proved by this map. Why had four centuries of contact with Europeans done so little even for geographical knowledge at that time? The answer to this question may be said to be mainly historical; but the history of our African colonies can never be understood without a study of the distribution of the dense belt of unhealthy forest along the shore; of the distribution of the different types of native inhabitants; and of the courses of the navigable rivers, all strictly geographical considerations.

Geography is the study of distribution, and early in that study we must be struck with the correlation of these different distributions. If we take a map of Africa, and mark on it all the areas within the tropics covered with dense forest or scrub, we shall find we have drawn a map showing accurately the distribution of the worst types of malarial fever; and that we have also indicated with some approach to accuracy—with, however, notable exceptions—the habitat of the lowest types of mankind. These are the facts which give the key to understanding why the progress of European colonization on the West Coast has been so slow.

Along the coast of the Gulf of Guinea we find settlements of Europeans at more or less distant intervals. All along, or nearly all along this same coast, we find a wide belt of fever-stricken forest, fairly thickly inhabited by uncivilized negro and Bantu tribes. Inside this belt of forest the country rises in altitude, and becomes more open, whilst at the same time there is a distinct improvement in the type of native; and the more we proceed inland, the more marked does this improvement

become. There appears, in fact, to have been a number of waves of advancing civilization, each one pressing the one in front of it towards these inhospitable forest belts. Near the coast the lowest type of negro is, generally speaking, to be found; then, as the more open country is reached, higher types of negroes are encountered—for example, the Mandingoes of the Senegal region are distinctly higher than the Jolas inhabiting the mouths of the Gambia; and the Hausas of the Sokoto empire are vastly superior to the cannibals of the Oil rivers. In both these cases the higher types are probably not pure negroes, but have Fulah, Berber, or Arab blood in their veins; for we see, in the case of the Fulahs, how they become absorbed into the race they are conquering. Near the Senegal river they are comparatively light in colour, but in Adamawa they are hardly to be distinguished by their features from the negroes they despise. Thus the process appears to have been a double one; the higher race driving some of the lower aboriginal tribes before them out of the better lands, and, at the same time, raising other tribes by means of an admixture of better blood. These waves of advancing civilization seem to have advanced from the north and east, for the more we penetrate in these directions, the higher is the type of inhabitant met with, until at last we reach the pure Berbers and the pure Arabs. Thus there are two civilizing influences visible in this part of Africa; one coming from the north and east—a Mohammedan advance—which keeps beating up against this forest belt and occasionally breaking into it; the other, a Christian movement, which, until the middle of this century, was brought to a dead halt by this same obstacle. The map of Africa, showing the state of geographical knowledge in 1815, makes it clear that, except in a few cases where rivers helped travellers through these malarial regions, nothing was known about the interior. No doubt much has been done since those days, but this barrier still remains the great impediment to progress from the West Coast; and those who desire our influence to spread more effectively into the interior must wish to see some means of overcoming this obstacle. On the East Coast of Africa the conditions are somewhat different, as there is comparatively little dense forest there; but the districts near that coast are also usually unhealthy, and how to cross those malarial regions quickly into the healthy or less unhealthy interior is the most important problem connected with the development of tropical Africa.

Other influences have been at work, no doubt, in checking our progress from the West Coast. In old days, the European possessions in these districts were mere depôts for the export of slaves. As the white residents could not hope to compete with the natives in the actual work of catching these unfortunate creatures, and as the lower the type the more easily were they caught, as a rule, there was no reason whatever for attempting to penetrate into the interior, where the higher types are met with. But, though this export trade in human beings is now no longer an impediment to progress, the slave trade in the interior still helps to bar the way. When the forest belt is passed, we now come, generally speaking, to the line of demarcation between the Mohammedan and the pagan tribes, and here slave-catching is generally rife; when it is so, the constant raids of the Mohammedan chiefs keep these border districts in a state of unrest, which in every way tends to impede progress. Thus a mere advance to the higher inland regions will not by any means solve all our difficulties, but it will greatly lessen them; and it is universally admitted that the more communication with the interior is facilitated, the more easy will it be to suppress this terrible traffic in human beings. By the General Act of the Brussels Anti-Slavery Conference of 1890–91, it was agreed by the assembled delegates that the construction of roads, and, in particular, of railways, connecting the advanced stations with the coast, and permitting easy access

to the inland waters, and to the upper courses of rivers, was one of the most effective means of counteracting the slave trade in the interior. Here, then, we have the most formal admission which could be given of the necessity of opening up main trunk lines of communication into the interior.

But not only does geographical knowledge help to demonstrate the necessity of improving the means of communication between the coast and the interior, but it helps us to decide where it is wise to make our first efforts in this direction. In the first place, it is essential to note that if the continent of Africa is compared with other continents, its general poverty is clearly seen. Mr. Keltie, in his excellent work on the Partition of Africa, tells us that "at present (1895) it is estimated that the total exports of the whole of Central Africa by the east and west coast do not amount to more than 20,000,000*l.* sterling annually." For the purposes of comparison, it may be mentioned that the export trade of India is between sixty and seventy million sterling annually, and that India is only about one-seventh or one-eighth of the area of the whole of Africa. On the other hand, the trade of India has been increasing by leaps and bounds, largely in consequence of the country being opened out by railways, and there is every reason to hope that somewhat similar results would occur in Africa under similar circumstances, though the lower civilization of the people would prevent the harvest being so quickly reaped. But, however it may be as to the future, the present poverty of Africa is enough to demonstrate the necessity of pushing ahead cautiously and steadily, and of doing so in the most economical manner possible.

M. Decle, in an interesting paper, read before the International Geographical Congress in London last year, strongly advocated the construction of cheap roads for use by the natives, taking precautions to prevent any traffic in slaves along them. His suggestions are well worthy of consideration; but the cost of transport along any road would, I should have thought, soon have eaten up any profits on the import or export trade to or from Africa. What must be done in the first instance is to utilize to the utmost all the natural lines of communication which require little or no expenditure to render them serviceable; in fact, to turn our attention at first to the rivers and to the lakes. I have already pointed out that the early maps of Africa prove that the rivers have almost invariably been the first means of communication with the interior, and until this continent is rich enough to support an extensive railway system, we must rely largely on the waterways as means of transport.

It may be as well here to remark that geographical knowledge is often required in order to control the imagination. I do not know why it is, but almost every one will admit that, if he sees a lake of considerable size depicted on a map, he immediately feels a desire to visit or possess that locality in preference to others. A lake may be of far less commercial value than an equal length of thoroughly navigable river, and yet it will always appear more attractive. Look at the way in which the English, the French, and the Germans are all pressing forward to Lake Chad; and yet Lake Chad is in reality not much more than a huge swamp, and, in all probability, it is excessively unhealthy. Again, it is probable that the Albert Nyanza will prove to be of comparatively small value, because the mountains come down so close to its shores. Of course, the great lakes form an immensely important feature in African geography, but we must judge their commercial value rationally, and without the bias of imagination.

To develop the traffic along the rivers and on the lakes is the first stage in the commercial evolution of a continent like Africa. But it cannot carry us very far. Africa is badly supplied with navigable rivers, chiefly as a natural result of the general formation of the land. The continent consists, broadly speaking,

of a huge plateau, and the rivers flowing off this plateau are obstructed by cataracts in exactly the places where we most want to use them—that is, when approaching the coasts. The second stage in the commercial evolution will therefore be the construction of railways with the view of supplementing this river traffic. Finally, no doubt, a further stage will be reached, when railways will cut out the rivers altogether; for few of the navigable rivers are really well suited to serve as lines of communication. This last stage is, however, so far off that we may neglect it for the present; though it must be noted that there are some parts of Africa where there are no navigable rivers, and where, if anything is to be done, it must be entirely by means of railways.

Thus, as far as the immediate future is concerned, the points to which our attention should be mainly directed are (1) the courses of the navigable parts of the rivers, and (2) the routes most suitable for the construction of railways in order to connect the navigable rivers and lakes with the coast. As to the navigable rivers, little more remains to be discovered with regard to them, and we can indicate the state of our geographical knowledge on this point with sufficient accuracy for our purposes by means of a map. Of course the commercial value of a waterway depends greatly on the kind of boats which can be used, and that point cannot well be indicated cartographically.

As to the railways, we must study the physical features of the country through which the proposed lines of communication would pass. All the obstacles on rival routes should be most carefully surveyed when considering the construction of railways in an economical manner. Great mountain chains are seldom met with in Africa, and from that point of view the continent is as a whole remarkably free from difficulties. But drifting sand is often a serious trouble, and that is met with commonly enough in many parts. Wide tracts of rocky country also form serious impediments, both because of the cost of construction, and also because the supply of water for the engines becomes a problem not to be neglected. Such arid and sandy districts are, of course, thinly inhabited, and we may, therefore, generally conclude that where the population is scanty, there railway engineers will have special difficulties to face. On the other hand, dense forests are also very unsuitable. We have not much experience to guide us, but it would appear probable that the initial expense of clearing the forest, and the cost of maintenance, in perpetually battling against the tropical vegetable growth, will be very heavy; for it will not do to allow the line to be in constant danger of being blocked. The dampness of the forest, which will cause all woodwork and wooden sleepers to rot, will be no small source of trouble, and the virulent malarial fevers, always met with where the vegetation is very rank, will add immensely to the difficulty, both of construction and of maintenance. The health of the European *employés* will be a most serious question in considering the construction of railways in all parts of tropical Africa, for the turning up of the soil is the most certain of all methods of causing an outbreak of malarial fever; and the evil results would be most severely felt in constructing ordinary railways in dense forests. In making the short Senegal railway, where the climate is healthier than in many of the districts further south, the mortality was very great. Perhaps we shall have to modify our usual methods of construction so as to mitigate this danger, and, in connection with this subject, I may perhaps mention that the Lartigue system seems to be specially worthy of consideration—a system by which the train is carried on a single elevated rail. This is perhaps travelling rather wide of the mark of ordinary geographical studies, but it illustrates the necessity of a thorough examination of the environment before we try to transplant our own methods to other climes.

We may, however, safely conclude that we must as far as possible avoid both dense forests and sandy and rocky wastes in the construction of our first railways.

Then, as to the lines of communication, considered as a whole, rail and river combined, we must obviously, if any capital is to be expended, make them in the directions most likely to secure a profitable traffic. In considering this part of the question, it will be seen that there are several different problems to be discussed: (1) trade with the existing population in their present condition; (2) trade with the native inhabitants when their countries have been further developed with the aid of European supervision; and (3) trade with actual colonies of European settlers. To many minds the last of these problems will appear to be the most important, and in the end it may prove to be so. But the time at my disposal compels me to limit myself to the consideration of trade with the existing native races within the tropics, with only an occasional reference to the influence of white residents. We must, no doubt, carefully consider which are the localities most likely to attract those Europeans who go to Africa with the view of establishing commercial intercourse and commercial methods in the interior; and there can be no doubt that considerations of health will play a prominent part in deciding this point. Moreover, as the lowest types of natives have few wants, the more primitive the inhabitants of the district opened up, the less will be the probability of a profitable trade being established. For both these reasons the coast districts are not likely in the end to be as good a field for commercial enterprise as the higher lands in the interior; for the more we recede from the coast, the less unhealthy the country becomes, and the more often do we find traces of native civilization. To put it simply, we must consider both the density of the population and the class of inhabitant in the districts proposed to be opened up. Of course, the exact nature of the products likely to be exported, and the probability of demands for European goods arising amongst the natives of different districts, are vitally important considerations in estimating the profits of any proposed line of railway; but to discuss such problems in commercial geography at length would open up too wide a field on an occasion like this.

If the importance of considering the density of the population in the different districts in such a preliminary survey is admitted, we may then simplify our inquiry by declining to discuss any lines of communication intended to open up regions where the population falls below some fixed minimum—whatever we may like to decide on. Of course, the question of the greater or less probability of a locality attracting white temporary residents is very important, but unless there is a native population ready to work on, there will be little done for many years to come. Politically, it may or may not be right to open up new districts by railways for the sake of finding outlets for our home or our Indian population; but here I am considering the best lines for the development of commerce, taking things as they are. What, then, shall be this minimum of population? The population of Bengal is 470 per square mile; of India, as a whole, about 180; and of the United States, about 21 or 22. If it is remembered that the inhabitants of the United States are, per head, vastly more trade-producing than the natives of Africa, it will be admitted that we may for the present exclude from our survey all districts in which the population does not reach a minimum of 8 per square mile; it might be right to put the minimum much higher than this. On the map now before you, the uncoloured parts show where the density of population does not come up to this minimum, and we can see at a glance how enormously this reduces the area to be considered. The light grey indicates a population of from 8 to 32 per square mile, and the darker grey a denser population than that. Of course, such a map, in the very imperfect state of our knowledge, must be very inaccurate, as I am

sure the compiler would be the first to admit. On the same map are marked the navigable parts of rivers. I should like to have shown the dense forests also, but the difficulty of giving them with any approach to correctness is at present insuperable.

Here, then, is the kind of map we want in order to consider the broad outline of the questions connected with the advisability of attempting to push lines of communication into the interior. The problem is how to connect the inland parts of Africa, which are coloured grey on this map, with the coast, by practicable lines of communications, at the least cost, with the least amount of dense forest to be traversed, and, in the case of railways, whilst avoiding as far as possible all thinly populated districts.

It is, of course, quite impossible here to discuss all the great routes into the interior, and I should like to devote the remaining time at my disposal to the consideration of this problem as far as a few of the most important districts are concerned, confining myself, as I have said, to trade with existing native races within the tropics. Taking the East Coast first, and beginning at the north, the first region sufficiently populous to attract our attention is the Valley of the Nile, and parts of the Central Sudan. Wadai, Darfur, and Kordofan are but scantily inhabited, according to our map, and this is probably the case now that the Khalifa has so devastated these districts; but, without doubt, much of this country could support a teeming population, and is capable of great commercial development. The Bahr-el-Ghazal districts are especially attractive, being fertile and better watered than the somewhat arid regions further north. These remarks remind me how difficult it is at this moment to touch on this subject without trenching on politics. Few will deny that the sooner this region is connected with the civilized world the better, and it is only as to the method of opening it up, and as to who is to undertake the work, that burning political questions will arise. The geographical problems connected with the lines of communication to the interior can be considered whilst leaving these two points quite on one side.

A glance at the map reminds us of the well-known fact that below Berber the Nile is interrupted by cataracts for several hundred miles, whilst above that town there is a navigable waterway at high Nile until the Fola rapids are reached, a distance of about 1400 miles, not to mention the 400 to 600 miles of the Blue Nile and the Bahr-el-Ghazal, which are also navigable. The importance of a railway from Suakin to Berber is thus at once evident, and there is perhaps only one other place in Africa where an equal expenditure would open up such a large tract of country to European trade. This route, however, is not free from difficulties. Suakin is hot and unhealthy. Then the railway, about 260 miles in length, passes over uninhabited or thinly inhabited districts the whole way. Though the hills over which it would pass are of no great height, the highest part of the track being under 3000 feet above the sea, it is often said that the desert to be traversed would add greatly to the difficulty of construction. According to Colonel Watson, R.E., however, these difficulties have been greatly exaggerated, for the water-supply would give no great trouble. The sixth cataract, between Metemma and Khartum, would, it is said, make navigation for commercial purposes impossible when the waters are low; if this is so, it is probable that this impediment could be overcome by erecting locks, but it is impossible to estimate the cost of such works. Then again, the Nile above Khartum is much obstructed by floating grass or sudd, making navigation at times almost impossible; but it was Gordon's opinion that a line of steamers on the river, even if running at rare intervals, would keep the course of the stream clear; this, however, remains to be proved.

If the canalization of the sixth cataract should prove to be a necessary, but too

costly an undertaking, then it would be most advisable to carry on the railway beyond that obstacle. This might be done by prolonging the line along the banks of the Nile, or by adopting an entirely different route from Suakin through Kassala. I hope we shall hear something from Sir Charles Wilson as to the relative merits of these proposals during the course of our proceedings. Proposals have also been made for connecting the Nile with other ports on the Red Sea, and all of these suggestions should be carefully examined before a decision is made as to the exact route to be adopted. But in any case, considering the matter merely from a geographical standpoint, and putting politics on one side—a very large omission in the case of the Sudan—it would appear that one or other of these routes should be one of the very first to be constructed in all Africa.

Passing further south, it is obvious from the configuration of the shore, and from the distribution of the population, that the lines of communication next to be considered are those leading to the Victoria Nyanza, and on to the regions lying north and west of the lake.

Two routes for railways from the coast to the Victoria Nyanza have been proposed, one running through the British and the other through the German sphere of influence. Looking at the matter from a strictly geographical point of view, there is perhaps hardly sufficient information to enable us to judge of the relative merits of the two proposals. Both run through an unhealthy coast zone, and both traverse thinly inhabited districts until the lake is reached. The German route, as originally proposed, would be the shorter of the two; but there is some reason to think that the British line will open up more country east of the lake, which will be suitable for prolonged residence by white men. Sir John Kirk, in discussing the question of the possible colonization of tropical Africa by Europeans, said, "These uplands vary from 5000 to 7000 feet in height, the climate is cool, and, as far as known, very healthy for Europeans. The district is separated from the coast by the usual unhealthy zone, which, however, is narrower than elsewhere on the African littoral. Between the coast zone and the highlands stretches a barren belt of country, which attains a maximum width of nearly 200 miles. The rise is gradual, and throughout the whole area to be crossed the climate is drier and the malarial diseases are certainly much less frequent and less severe than in the regions further south." These very advantages, however, may have to be paid for by the greater difficulty of railway construction. Putting aside future prospects, the map shows that the populous region to the west of the lake makes either of these proposed lines well worthy of consideration, though it would perhaps be rash to predict how soon the commerce along them would pay for the interest on the capital expended. What will be the fate of the German project I do not know, but we may prophesy with some confidence that the British line, the construction of which has been commenced, will be completed sooner or later.

The two lines of communication we have discussed—the Suakin and the Victoria Nyanza routes—are intended to supply the wants of widely separated districts; but, looking to a more distant future, they must sooner or later—probably later—come into competition, one with the other, in attracting trade from the Central Sudan. Before this can occur, communication by steamboat and by railway must be opened up between the coast and the navigable Nile by both routes. This will necessitate a railway being constructed, not only to the Victoria Nyanza, but also from that lake, or round it, to the Albert Nyanza; and, as the Nile is rendered unnavigable by cataracts about Dufile, and as the navigation is difficult between Dufile and Lado, here also a railway might be necessary in order to complete the chain of steam communication with the coast. If goods were brought across the Victoria Nyanza by steamer, and taken down the Nile in the same manner from the Albert

Nyanza to Dufile, this route would necessitate bulk being broken six times before the merchandise was under way on the Nile; by the Suakin route, on the other hand, bulk would only have to be broken twice, provided the sixth cataract were navigable. Thus, if this latter difficulty does not exist, or can be overcome, and if the sudd on the Nile is not found to impede navigation very much, this Nyanza route will certainly not compete with the Suakin route for any trade on the banks of the navigable Nile until a railway is made from the coast to Lado, a distance of over 800 miles as the crow flies, and certainly over 1000 miles by rail. It must be remembered, also, that the Nyanza route passes over mountains 8700 feet above the sea; that the train will have to mount, in all, nearly 13,000 feet in the course of its journey from the coast; and that a difficult gorge has to be crossed to the eastward of the Victoria Nyanza. From these facts we may conclude that it will be a very long time before the Nyanza route will draw any trade from the Central Sudan; so long, that the idea may be neglected for the present.

The line through the British sphere of influence runs to the northern end of Victoria Nyanza, but from Mr. Vandaleur's recent expedition into these regions we learn that a shorter route, striking the eastern shore of the lake, is under consideration. To lessen the expense of construction would be a great boon, but if we look to the more ambitious schemes for the future, something may be said in favour of the original proposal as being better adapted to form part of a line of railway reaching the navigable Nile.

With regard to the comparison between the German and British routes to the Victoria Nyanza, the latest accounts seem to imply that the Germans have practically decided on a line from the coast to Ujiji, with a branch from Tabora to the Victoria Nyanza. This would be a most valuable line of communication; but it seems a pity that capital should be expended in competitive routes when there are so many other directions in which it is desirable to open up the continent. If the Germans wish to launch out on great railway projects in Africa, let them make a line from the south end of Lake Tanganyika to the northern end of Lake Nyasa, and thence on to the coast; they would thus open up a vast extent of territory, and Baron von Schele tells us that a particularly easy route can be found from Kilva to the lake. Such a line of communication, especially if eventually connected with the Victoria Nyanza to the north, would be more valuable than any other line in Africa in putting an end to the slave trade, as it would make it possible to erect a great barrier, as it were, running north and south across the roads traversed by the slave-traders.

A line through German territory connecting Lake Nyasa with the sea would, no doubt, come into competition with the route connecting the southern end of that lake with the Zambesi, and thus with the coast. The mouths of the Zambesi, though they are passable, will always present some impediment to commerce. But after entering the river navigation is not obstructed until the Murchison Rapids on the Shiré river are reached. Here there are at present 60 miles of portage to be traversed, and this transit must be facilitated by the construction of a railway, if this route is to be properly developed; Mr. Scott Elliot tells us that 120 miles of railway, from Chiromo to Matope, would be necessary for this purpose. Beyond this latter point there is a good waterway to Lake Nyasa. Thus a comparatively short line of railway would open up this lake to European commerce, and this route is likely to be developed at a much earlier stage of the commercial evolution of Africa than the one through German territory above suggested. It will be seen that these routes connect fairly populous districts with the coast, and it must also be recollected that the high plateau between Lake Nyasa and the Kafue river is one of the very few regions in tropical Africa likely to attract white men as more or less permanent residents.

Further south we come to the Zambesi river, which should, of course, be utilized as far as possible. But this line of communication to the interior has many faults. The difficulties to be met with at the mouths of the Zambesi have already been alluded to. Then the whole valley is unhealthy, and white travellers would prefer any route which would bring them on to high land more quickly. Moreover, the Kebrabasa rapids cause a serious break in the waterway, and, as the river above that point is only navigable for canoes, it is doubtful if it would ever be worth making a railway for the sole purpose of connecting these two portions of the river.

As the population of the upper Zambesi valley is considerable, and as the country further from its banks is said to be likely to be attractive to white men, there can be no doubt of the advisability of connecting it with the coast. This naturally leads us to consider the Beira route, as a possible competitor with the Zambesi. A 60-centimetre railway is now open from Fontesvilla to Chimoio (190 kilometres), and it is probable that during the course of the next two years the construction of the railway will be completed from the port of Beira itself as far as the territory of the Chartered Company. This will form the first step in the construction of a much better line of communication to the upper Zambesi regions than that afforded by the river itself. It is true that the gauge is very narrow, and that the first part of the line passes through very unhealthy districts; but this line will nevertheless be a most valuable addition to the existing means of penetrating into the interior of the continent. It is needless to say that the object of this railway is to open up communications with Mashonaland, not for the purposes now suggested.

South of the Zambesi the map shows us that there are no regions in tropical Africa where the density of the native population reaches the minimum of eight per square mile. Here, however, we come to the gold-fields, where there is attractive force enough to draw white men in great numbers within the tropics, and where, no doubt, some of the most important problems connected with railway communications will have to be solved in the immediate future. But, for reasons of time and space, I have limited myself to the discussion of districts within the tropics, where trade with the existing native races is the object in view. The Beira railway does not in reality come within the limits I have imposed on myself, except as to its future development. Had time permitted, I should like to have discussed the route leading directly from the Cape to Mashonaland, its relative merits in comparison with the Beira railway, and as to where the two will come into competition one with the other. But I must pass on at once to consider the main trunk routes from the West Coast leading into the interior of Africa.

Passing over those regions on the West Coast where railways would only be commenced because of the probable settlement, temporary or permanent, of white men—passing over, that is, the whole of the German sphere of influence—we first come to more dense native populations near the coast towns of Benguela and St. Paul de Loanda. The latter locality is the more hopeful of the two, according to our map, and here we find that the Portuguese have already constructed a railway leading inland for 191 miles to close to Ambaca. The intention of connecting this railway with Delagoa Bay was originally announced, and I am not aware to what extent this vast project has now been cut down, so as to bring it within the region of practical proposals. A further length of 35 miles is, at all events, being constructed, and 87 more miles have been surveyed. The Portuguese appear to be very active at present in this district, as there are several other railways already under consideration; one from Benguela to Bihe, of which 16 miles is in operation, another from Mossamedes to Huilla Plateau, and a third from the Congo to the

Zambesi. It is difficult to foretell what will be the outcome of these schemes, but our population map is not very encouraging.

Next we come to the Congo, and here there is a grand opportunity of opening up the interior of the continent. In going up this great stream from the coast we first traverse about 150 miles of navigable waterway, and afterwards we come to some 200 miles of cataracts, through which steamers cannot pass. Round this impediment a railway is now being pushed, 189 kilometres of rails (117 miles) being already laid. Then we enter Stanley Pool, and from this point we have open before us—if Belgian estimates are to be accepted—7000 miles of navigable waterway. If this fact is correct, and if the population is accurately marked on our map, then there is no place in all Africa where 200 miles of railway may be expected to produce such marked results. The districts traversed are unhealthy, and the natives are, generally speaking, of a low type; but in spite of these drawbacks, which no doubt will delay progress considerably, we may confidently predict a grand future for this great natural route into the interior.

To the north of the Congo, the next great navigable waterway met with is the Niger. Again, granting the correctness of the population map, it can be seen at a glance that there is no area of equal size in all Africa so densely inhabited, and no district where trade with the existing native population appears to offer greater inducement to open up a commercial route into the interior. Luckily, little has to be done in this respect, for the Niger is navigable for light-draft steamers in the full season as far as Rabba, about 550 miles from the sea; here the navigation soon becomes obstructed by rocks; and at Wuru, about 70 miles further up the river, the rapids are so unnavigable that even the light native canoes have to be emptied before attempting a passage, and there are frequent upsets. From Wuru the rapids extend to Wara, after which a stretch of clear and slow-running river is met with. Above this, again, the Altona rapids extend for a distance of 15 miles, then 15 miles of navigable waterway, and then 20 miles more of rapids are encountered. Yelo, the capital of Yauri, is situated on these latter cataracts, above which the Middle Niger is navigable for a considerable length. The Binue is also navigable in the floods for many miles, the limits being at present unknown; part of the year, however, it is quite impassable except for canoes. The trade with the Western Sudan, which has been made possible by the opening up of this river, is still only in its infancy, and to get the full benefit of this waterway a line of railway ought to be carried on from Lokoja to Kano, the great commercial centre of Hausaland; Mr. Robinson's recent journeys over this country, which we hope to hear about at a later period of our proceedings, have served to confirm the impression that no great physical difficulties would be encountered. The political condition of the country may, however, make the construction of this railway quite impossible for the present; for here we are on the borderland between Mohammedanism and Paganism, where the slave trade always puts great impediments in the path of progress, but where the same circumstances make it so eminently desirable to introduce a higher condition of civilization. The only drawback to the Niger as a line of communication to the Western Sudan is the terribly unhealthy nature of the coast districts which have to be traversed. Any man, who finds a means of combating the deadly diseases here met with, will be the greatest benefactor that Africa has ever had; but of such a discovery there are but few signs at present.

It is perhaps too soon to speculate as to the best means of opening a trade route to Wadi, and the more central parts of the Western Sudan; for we may be sure that little will be done in this direction for years to come. Several competing routes are possible. From the British sphere, we may try to extend our

communications eastward from the navigable parts of the Binue. The French, on the other hand, may push northwards from Ubangi; whilst, in a later stage of commercial evolution, the best route of all may be found through German territory, by pushing a railway from the shore in a direct line towards Bagirmi and Wadai. To compare the relative merits of these trunk lines is perhaps looking too far into the future, and traversing too much unknown country, to make the discussion at all profitable.

Proceeding northwards, or rather westwards, along the coast we find ourselves skirting the belt of dense forest already described as being the great obstacle to advance in this part of Africa. It is to be hoped that this barrier will be pierced in several places before long. Naturally we turn our attention to the different spheres of British influence, and here we are glad to learn that there are several railways being constructed or being considered, with a view to opening up the interior.

At Lagos a careful survey of a railway running in the direction of Rabba has been made, and the first section is to be commenced at once. To connect the Niger with the coast in this way would require 240 miles of railway, but the immediate objectives are the towns of Abeokuta and Ibadan, which are said to contain more than a third of a million inhabitants between them. No doubt the populous coast region makes such a line most desirable; but whether it would be wise to push on at all quickly to the Niger, and thus to come into competition with the steamboat traffic on that river, is a very different question.

Surveys have also been made for a railway to connect either Kormantain or Apan on the Gold Coast with Insuaim, a town situated on a branch of the Prah. It is believed that the local traffic will be sufficiently remunerative to justify the construction of this line. But, looking to the further prolongation of this railway into the interior, it appears possible that those who selected this route were too much influenced by the desire to reach Kumasi, which is a political rather than a commercial centre. According to the views I have been advocating to-day, the main object of a railway in this quarter should be the crossing of the forest belt, and if, as there is some reason to believe, that belt is exceptionally wide and dense in this locality, the choice of Kumasi as a main point on the route will have been an unfortunate selection. A little further south, nearer the banks of the Volta, it is probable that more open land would be met with, and, moreover, that river itself, which is navigable for steam launches from Ada to Akusi, would be of use as a preliminary means of transport. It is to be hoped that the merits of a line from Accra through Odumase will be considered before it is too late.

I am now approaching the end of my brief survey of tropical Africa, for the best method of opening communication between the upper Niger and the coast is the last subject I shall touch on. With this object in view, the French have constructed a railway from Kayes, the head of steam navigation during high water, on the Senegal to Bafulabe, with the intention of ultimately continuing the line to Bamaku on the Niger. Unexpected difficulties have been met with in the construction of this railway, and, as the Senegal river between Kayes and St. Louis is only navigable for about a quarter of the year, it would hardly appear as if the selection of this route had been based on sound geographical information. No doubt the French will find some other practicable way of connecting the upper Niger with the coast, and surveys are already in progress with that object in view. It may be worth mentioning that the Gambia is navigable as far as Yarbutenda, and that it affords on the whole a better waterway than the Senegal; it is possible, therefore, that a railway from Yarbutenda to Bamaku might form a better means of connecting the Niger with the coast than the route the French have selected.

At Sierra Leone a railway is now being constructed in a south-easterly direction with a view of tapping the country at the back of Liberia. But here, as in the case of the Gambia route, political considerations are of paramount importance; for no doubt the best commercial route, geographically speaking, would have been a line run in a north-easterly direction to some convenient point on the navigable part of the upper Niger. If such a railway were ever constructed, it would connect the longest stretch of navigable waterway in this region with the best harbour on the coast. But the fact that it would cross the Anglo-French boundary is a complete bar to this project at present.

Proposals for connecting Algeria with the upper Niger by rail have often been discussed in the French press, the idea being to unite the somewhat divided parts of the French sphere of influence by this means. If the views here sketched forth as to the necessity of selecting more or less populous districts for the first opening up of lines of communication into the interior are at all correct, these projects would be simple madness. For many a year to come Algeria and the Niger will be connected by sea far more efficiently than by any overland route, and I feel sure that when the details of these plans are properly worked out we shall not find the French wasting their money on such purely sentimental schemes.

I must now conclude, and must give place to the other geographers who have kindly undertaken to read papers to us on many interesting subjects. All I have attempted to do is briefly to sketch out some of the main geographical problems connected with the opening of Central Africa in the immediate future. Such a review is necessarily imperfect, but its very imperfections illustrate the need of more accurate geographical information as to many of the districts in question. Many blunders may have been made by me in consequence of our inaccurate knowledge, and, from the same cause, many blunders will certainly be made in future by those who have to lay out these routes into the interior. In fact, my desire has been to prove that, notwithstanding the vast strides that geography has made in past years in Africa, there is yet an immense amount of valuable work ready for any one who will undertake it.

Possibly, in considering this subject, I have been tempted to deviate from the strictly geographical aspect of the case. Where geography begins and where it ends is a question which has been the subject of much dispute. Whether geography should be classed as a separate science or not has been much debated. No doubt it is right to classify scientific work as far as possible; but it is a fatal mistake to attach too much importance to any such classification. Geography is now going through a somewhat critical period in its development, in consequence of the solution of nearly all the great geographical problems that used to stir the imagination of nations; and for this reason such discussions are now specially to the fore. My own humble advice to geographers would be to spend less time in considering what geography is and what it is not; to attack every useful and interesting problem that presents itself for solution; to take every help we can get from every quarter in arriving at our conclusions; and to let the name that our work goes by take care of itself.

FROM TEHERAN TOWARDS THE CASPIAN.

By Lieut.-Colonel HENRY L. WELLS, R.E.

TEHERAN, the capital of Persia, occupies a depression on the lowest slopes of the Elburz range of mountains which, running east and west, separates the entirely dry province of Irak from Gilan and Mazanderan, provinces situated on the

southern shores of the Caspian, and consequently deriving abundance of moisture from the fogs and rain produced by the sun's action on that inland sea. In the latter region the forests recall those of the Indian Terai, and, like them, are infested by tigers and intersected by ricefields. The fogs that roll almost perpetually southwards from the Caspian would, if unchecked by the Elburz, impart their refreshing influence to the arid plains of Persia; but they are vigorously met by the hot, dry air of the central desert, and the mountain-tops of the intervening watershed become, as it were, a battle-field for the ceaseless contests of the two great genii of damp and drought. In summer the climate of the upper mountain slopes is most enjoyable. The sides facing north have a fauna and flora like those of Central and Northern Europe; facing south, they remind one rather of Italy and Spain. All who can, quit the city of Teheran during June, July, and August, to take up their abode in the picturesque villages of the southern slopes of the Elburz range. The most frequented summer resorts are situated at a distance of 7 or 8 miles from the city, and at an altitude varying from 1000 to 1500 feet above it. There are in all some 400 Europeans in Teheran, including members of the various legations, *employés* of the Indo-European Telegraph Department, the English and Russian banks, and the tramway, sugar and glass manufactories, as also hotel-keepers and owners of shops. The head-quarters of the English for the summer months is the village of Gulahek, which was presented to them by Fath 'Ali Shah at the commencement of the present century. It is situated at a distance of $6\frac{1}{2}$ miles from the city and 920 feet above it—that is, at an altitude of 4800 feet above the sea.

A German capitalist has lately obtained a concession for a light electric tramway or railway to connect the various summer resorts with the city, and the enterprise promises to be lucrative. There is already a railway, $4\frac{1}{2}$ or 5 miles in length, from the south-eastern gate of Teheran to a favourite shrine; and a road fit for wheeled vehicles is in course of construction to the Caspian, so that ere long the capital will be reached from the seashore with comparatively little difficulty.

On June 18, 1895, at 7 a.m., three of us left Gulahek for Mazanderan. The lofty Tuchal mountain—a branch of the Elburz—which lies north of Teheran, is so covered with snow in the early summer that the track across its summit, the most direct route to the north, cannot be used before August. Therefore we had to skirt the mountain range in an easterly direction along its base till a suitable pass was reached. Such we found in the Jager Rud, or river, which, rising near the Elburz watershed, flows south until lost in the great desert. The *détour* was picturesque. On our left were rocky heights still crested with snow; in the far distance, behind many intervening ranges, peeped the cone of Demavend, the crater-lip of which has an altitude of 19,400 feet above the sea; in the mid-distance, the morning sun threw lovely tints upon the barren hills; in the foreground, the ripening crops of barley, with patches of luxuriant lucerne and sweet-scented beans, showed the extent of the fertilizing streams. Blue jays and brilliant bee-eaters sat in the trees along the roadside, whilst quails and buntings made a merry noise in the adjoining crops.

About 2 miles east of Gulahek is Sultanetabad, one of the Shah's summer resorts. Another one, Niaveran, is situated a mile further up the slope. These palaces are surrounded by groves of mulberry, poplars, and willows; here, too, thickets of cherry and apricot afford good harbour for woodcock in winter. We followed an avenue of prim *navend* trees, a kind of witch elm, common in Persia, in shape, for all the world, like trees from a toy-box, but very bright and pleasing in colour. Their matted branches give absolute protection to small birds, and must account for the numbers which escape from the hawks infesting the country.

Save for the existence of a few isolated gardens east of Sultanetabad, the limits of cultivation were now attained. On the border waste lands flourish the flowered chickory, and pale yellow and pale pink hollyhocks, through whose wan petals the sunshine has a pretty effect. There is also a picturesque thistle, with flowers varying in hue from ultramarine ash to French grey, which take the form of perfect spheres. In contrast with ripe corn these produce a wonderful effect. Another greyish-blue plant, very common on the edges of the cornfields, has a blue foliage, and the younger sprouts of spiky leaves are of a bright metallic colour. Once beyond the limit of water-supply, all is barren except in spring-time. The remainder of our two hours' ride over the spur which forms the watershed between the Teheran drainage-area and valley of the Jager had, consequently, but little interest.

We commenced ascending the right bank of the river through a deep gorge. The way led over a very rough though well-cared-for mule-track. After four hours in the saddle we reached the picturesque village of Uchan, situated at the junction of two branches of the river, at an altitude of 5800 feet. The valley opens out to a quarter of a mile in width at this place; and the stream, beside which our camp was pitched, has a stony and rocky bed, over which the waters roll in a deafening torrent. Behind us was a narrow strip of cultivation, bordered by poplars, walnuts, and willows, while above were seen the mountains, rising to some 11,000 feet, along the base of which we had travelled from Lashkerek. The air at Uchan was perceptibly cooler than that at Gulahek; between the two places there is a short cut by a steep and difficult pass known as the "Talhouse." On June 19 we started, on mules with a muleteer guide, up the left branch of the Jager river, for general purposes of exploration, as well as to visit a coal-mine belonging to the Teheran gas company. The track, well preserved hitherto, practically disappeared beyond Uchan, but reappeared after two miles at the village of Pachemp. By a bridge in course of construction and other signs, we became aware that the Shah was expected to pass shortly in this direction, *en route* to Lar and Kujur, favourite camping-grounds of his Majesty. The scene was very beautiful. In this upper part of the river's course, the banks lend themselves to cultivation better than below Uchan, and the peasants, like hill-men in all countries, have taken advantage of every available square inch of ground. The crops were all fresh-looking; the wheat was hardly yet in ear; the lucerne, in flower, stood quite 2½ feet high, and men clad in picturesque rags were cutting it. In the patched garments of these peasants was displayed every shade of blue, from indigo to ultramarine ash, the shades being somehow all harmonized by wear and tear. Occasionally a man might be seen wearing a tunic of old crimson plush, which at threadbare points had a plum-coloured sheen.

At the borders of the tiny fields and beside the roaring torrents were clumps of luxuriant stuff, with handsome leaves and large white flowers of the umbellifera class, the size of a saucer. This plant emits a noisome odour when touched. There were plenty of pretty flowers, and quantities of barberry, briars, and dog-roses in full bloom. Above the cultivation the valley was bounded by frowning cliffs of conglomerate and ironstone, in the crevasses of which were patches of frozen snow, whence rushing streams issued across our path.

At Saigon, a small village, we left the king's highway, a track 7 feet broad, but we could trace it for many miles, till it was lost behind a spur surmounted by a white dome, known as the shrine of Aborek. The track we now had to follow was only just passable for laden mules. However, after moving for two miles up the side valley, we arrived at the large village of Lalan. Making for certain black patches which marked the entrance to the coal workings, visible in the distance,

and almost at the summit of a range of mountains fronting us, we managed, after a hard and hot climb, to reach the door of the manager's hut, a grimy one-roomed abode, having on one side of its walls prints of a religious character, and on another guns, rifles, and game-bags. Zakhary, the owner, we found a remarkable man in his way. He is a Chaldean Roman Catholic from the neighbourhood of Urumia (or Urmi), and thus a subject of the Shah, and he spoke in raptures of his native country. Grizzled hair, a calm handsome face, and beautiful teeth made up a countenance not soon forgotten. Above all, his cheerfulness and contentment with his lot most favourably impressed us. He has one fellow-Catholic with him, whose children welcomed us in Chaldean. Zakhary himself, whose own belongings were shortly to join him, spoke excellent French. He has twenty Turks, from the neighbourhood of Tabriz, employed on the works, the Persians refusing to labour underground. The miners are paid 5 *krans* for 650 lbs. (a Persian measure known as *kharwar*),* and can earn up to that sum (or about two shillings) a day. Zakhary has to procure rice, dried fruit, with bread stuff for their consumption, and sells them these articles at cost price, plus carriage. Three mules, to fetch provisions, are provided by the gas company, and these carry broken tools to the city for repairs, making up their loads with coal.

There is a forge at the mine, and hutting for the miners; also an iron-roofed store to protect the coal "got" in the winter from the action of snow and rain. From Zakhary's account, the climate at the mines, which are situated on the southern slope of a range running east and west, is most salubrious. It is only in March and April that rain and mists are annoying. In summer it is not hot, and in winter the snow does not lie for any length of time. Our informant only quits his home twice a year, to attend the festivals of Christmas and Easter respectively in Teheran.

South of the manager's hut is seen a rocky ridge, said to harbour leopards. On the mountains behind the mines are pastures for moufflon, and wild rhubarb abounds. To the east there is a glorious view of Demavend towering into the sky.

The quality of the coal did not impress us much, for it "comes out" as dust; but for the production of gas, in which it is said to be very rich, this does not greatly matter. It is found in sandstone, and it seems likely that it only exists in pockets, *i.e.* is the remains of lacustrine deposits. The seams are vertical, *i.e.* have a "dip" of 90°. They vary from 1 foot to 5 feet in thickness. The "strike" seems to be east and west. One working into which we went was pronounced unsafe, and nothing was going on there, pending the arrival of timbering from Mazanderan. This gallery ran horizontally in from the face of the hill, and wound about, following the seam or pocket. The whole of the roof was coal, and in one place a shaft had been sunk to get at the coal below; this was now full of water.

Zakhary had ingeniously arranged a syphon for the emptying of this shaft. One of our servants nearly fell into it, having followed us along the working without a light; in fact, but for our timely return, to find him on the brink of the shaft, he must have been lost. Two men lost their lives owing to the falling of the roof at the mouth of a working last year—otherwise there have been no accidents. There is said to be no fire-damp, but as no working has yet been pushed more than a hundred yards into the hill, it is possible it may yet be met with.

Zakhary went to Europe to learn printing, and then took to brewing—not a

* Wollaston gives this at 725 lbs; perhaps 625 to 675 lbs., of which 650 is the mean, is more strictly correct.

useful education for a miner. His statement that the whole mountain near his mine is full of coal is not to be relied on. We bade him adieu after promising to revisit him in the shooting season, and started homewards, making the 14 miles to be covered one long race. In camp we were joined by two friends, who had delayed their departure from Gulahek a day later than ourselves, and also by a personage who announced that he was the Shikarchi Bashi to the Shah. The last, a spare wiry man, with small bright eyes and somewhat sly expression, withal an incessant talker, introduced himself by saying that he had been sent to see that we got good sport, and received due honour and hospitality at the hands of the population. It was only by feigning inability to comprehend his egotistical chatter that we contrived to rid ourselves of this intrusive *attaché;* so that, after the first day's proceedings, he changed his tactics, and favoured us but little with his company, except at the hour of starting in the morning. At such time he would appear accompanied by his henchman, both decently mounted. His occupation, apparently self-imposed, was to go ahead and turn out the greybeards of every village through which we passed, all of whom appeared, bringing a lamb as an offering. Had we accepted these lambs, we should have been possessed of a large flock before reaching Mazenderan. What the Shikarchi Bashi made out of the transaction, it was difficult to gather. He probably told each headman that he had persuaded the *sahibs* not to take the lambs, and therefore merited a small sum for his good offices. As regards any service to ourselves, he never came near our camp when we reached the ibex-ground at Sheristanek; and the same thing happened on our entering the bear country in Mazenderan.

From Uchan our road led up the Egil river, a tributary of the Jager, and followed the actual bed of the stream for some distance. The valley is rugged and less picturesque than that of the main stream. We passed Egil village, which has an evil reputation, as it is said to harbour the much-dreaded "stranger-biter" (*gharib gez*), or poisonous bug.

We breakfasted in a lovely spot beyond a village named Ahah (altitude 6700 feet), beneath the shade of walnuts, with a roaring torrent in front. From Ahah the watershed which divides the sources of the Jagerud and Sheristanek rivers has to be crossed by those who wish to get into the valley of the latter. This takes two and a half hours of mountain roads. The summit of the watershed has an altitude of 8700 feet. Except for the first 600 feet, the road presented no serious difficulty, and our muleteer, who lost an animal by falling over the mountain-side, was himself to blame for the mishap.

From the watershed there is a wonderful view of bare mountains; not a tree is to be seen anywhere. The contorted and variegated strata of the mountains to the north-east, in which direction we were going, are suggestive of an enormous slate quarry, about the size of an English county, with altitudes varying from 4000 to 10,000 feet. To the south, and close by, lie the northern slopes of the Touchal range, the southern side of which forms so conspicuous a feature in the Teheran landscape. The track, rising to nearly 12,000 feet, by which the distance from Gulahek to Sheristanek may be traversed in eight hours in the late summer, was visible, with large patches of snow lying across it.

From the watershed down to the Sheristanek valley was a comparatively dull march, though relieved by an occasional peep at the terraced fields and the sight of the Shah's red-roofed *chateau*, situated at the head of the valley. The river appeared a perfectly white roaring torrent. The *chateau* looked prim enough, but badly placed in what must be a stifling hole.

On reaching the valley, we found the crops all green and luxuriant, the foliage of the poplars and walnuts in perfection, and the roaring river even more

picturesque than when seen from a distance. Four miles down the valley we reached our camp at the extremity of the cultivation, altitude 6300 feet. Here the torrent enters a wild rocky gorge, foaming and boiling with a deafening noise, and yet in the swirls behind the stones trout are harboured, as we proved when whipping these eddies with a fly. How trout come to be in this river, or why they should exist in this and not in the Jager, or any other river which has a similar course, viz. from the Elburz range into the great central desert, is an unexplained mystery. On the 21st we halted, one of our party going after ibex, the others fishing. Another animal of our caravan met its death here by falling down a precipice when turned out to graze. A tall coarse sword-grass, poisonous to horses, mules, and asses, grows on the watershed between the Jager and Sheristanek rivers. The animals, unconscious of its dangerous properties, eat of it with deadly effect, unless happily prevented from doing so.

On the 22nd our road lay for half a mile down the Sheristanek river, to where it joins the Laura, a stream three times the size of, and, if possible, more rapid and turbulent than, the first-named. Its ochre-coloured waters dashed onwards, swollen with melted snow. The Doab, or junction of the two streams, is at a wild romantic gorge, in which they are lost to sight amid precipitous crags of red rocks. When united, they bear the name of the Kerij river. There is no road out of this Kerij, nor indeed out of the Sheristanek valley, more practicable than that by which we entered, *viâ* Uchan. We now followed the left bank of the Laura, passing northwards through gap and gorge, in red sandstone and conglomerate, standing rugged and bold with vertical "dip." Further up-stream, where the river-banks are edged by a few trees, the views are very picturesque. Where the strata are less hard, they have weathered into slopes of fine *detritus;* and down them the peasants come at a great rate, almost as if they were snow-slides. Eight miles up the Laura we encamped at *Gachisar*, literally, "head or source of gypsum," where the geological character of the country changes, and the mountains have rounded contours, with some grass, but still not the vestige of a tree. Here, at an altitude of 6700 feet, we passed a very cold night. On the 23rd, when we started across the Kendevan pass, ominous white clouds were overhanging the mountains to the north.

At Gachiser, the main stream of the Laura is crossed by a one-arch bridge, and its right bank is followed for about three-quarters of a mile. Then its valley is abandoned, for it turns sharp east. The gorge, down which a small tributary flows, is followed for another 1½ mile. This gorge had still snow lying in it where the road takes huge zigzags up the rounded slope of the mountain to the north. In an hour and three-quarters from Gachiser, the summit of the watershed between the Caspian and the central plateau of Persia is reached. At an altitude of 10,000 feet, the sandy loam on the south slope of the watershed is covered with flowers; many of the vetch tribe and wild fennel grow here in large clumps. The wind at the top of the pass was bitterly cold; the driving mist was freezing on the posts placed at intervals to keep the traveller from losing the track. There is a small refuge near the summit built in brick; in fact, the whole road shows that an amount of care is bestowed on it such as is observable on no other track in Persia. The zigzags for the descent on the Caspian side are required for a shorter distance than for the ascent from the south. In three-quarters of an hour from the summit we were following the course of one of the branches of the Touchal river, in a country clearly under the influence of the refreshing rain-clouds from the Caspian. Grass, yellow irises, ferns, and succulent water-plants fringed the streams. Further up the mountain-sides, clumps of magnificent columbines, of bluish-purple with white centres, and scarlet poppies, with blooms the size of breakfast-cups and

buds the size of walnuts, formed lovely masses of colour. Lavender, and many varieties of a sort of white campion, of the most delicate form, with the flowers arranged with curious regularity, were to be recognized amongst many other beautiful plants which it would require a botanist to classify and describe.

A wetting mist hid all distant features. We descended rapidly, and found the slopes further down clothed with scrub of oak, hornbeam, and sycamore, interspersed with wild pear and apple, buckthorn, and brambles. Here and there more open patches showed hawthorns and other flowering shrubs. The ground between them was literally carpeted with flowers. The presence of the tall yellow spikes of a flowering plant, similar in character to those observed in the hedgerows and brakes in the west of England, prepared us to find cowslips, periwinkles, crowsfoot, wild strawberries, and a crowd of other flowers that fringe the woods at home, besides quantities that were new to us. Wild roses and sweetbriars with blooms of every hue, from darkest pink to white, scented the air. The impression that we were following the drive to some domain on the coast of Devon constantly recurred. We saw also a beautiful shrub of handsomer growth, but with a flower resembling in shape that of the laburnum, only a richer chrome in tint. Another was quite beautiful, like honeysuckle both in leaf and flower, only growing as a rounded bush of graceful form. There were quantities of everlasting pea with dark crimson flowers, and here and there the giant poppy, already described, blazed in deep scarlet grandeur. The roar of a torrent replaced that of waves. We could fancy ourselves at Mount Edgcombe and that, when the mist lifted, Plymouth breakwater or the "Mewstone" would appear in the distance. The mist did eventually lift, to disclose the Chel-haus river boiling below, with precipitous cliffs of ruddy rock clothed in forest wherever trees could hold. These formed the foreground to a magnificent view of gorge, rock, and wood, leading the eye to distant spurs, overtopped in the far distance by a snow-capped range of great altitude and rugged outline. The moisture in the atmosphere gave the soft cobalt tint to the distant mountains so grateful to eyes long used to the glare and the crisp outlines of dry inland Persia. Our camp was pitched on the right bank, about 300 feet above the river, so we were spared the deafening din of its surging torrent, and able to hear the familiar notes of a blackbird which rang out in the stillness of the evening. About a mile south of our camp was the village of Valiabad. The younger brother of the Nasru's-Saltaneh, who came to visit us, thoughtfully brought with him his two *shikaris*, as well as presents of rice and sheep. Talking on the prospects of sport, we were told of bear and stag in the neighbouring forests, and of ibex and moufflon on the hilltops; moreover, that salmon was to be found one day's march further down-stream. The *shikaris*, father and son, were accompanied by a *mirza*, to represent the governor himself, and see that the villages sold us good provisions. These men were of a distinctly Mazanderani type, somewhat darker in complexion than the ordinary Persians. Their jet-black hair was curled in ringlets; moreover, they had brighter eyes and expressions, and were of handsomer face, than the inhabitants of the plateau. They informed us that a certain part of the country was the Shah's preserve, the remainder that of their own immediate master; but that we, having the royal permission to shoot, were privileged to avail ourselves of the whole. We tried for trout that evening, but, after reaching the river with great difficulty, we found it unfishable. On the 24th, owing to the report of three of our party who made a reconnaissance, we decided that the road towards the Caspian was too steep and dangerous for horses, and proceeded to negotiate it on our baggage mules.

Looked at from our camp, the road was found to rise gently as it wound northwards along the face of steep slopes and overhanging precipices. From it no fence

or wall prevents your seeing the abyss, some 1000 or 1500 feet in depth. We looked to our surcingles. Perched on the top of a pack-saddle as high as if riding a 16-hand horse, but with no command over your quadruped, you soon come to the conclusion that such a position is far more dangerous than it would be if one were riding one's own horse, even if he were somewhat fresh, for, at all events, he would not insist on always keeping along the outer edge of the track, as pack-mules obstinately do. When we had once started, the road proved to be less risky than it looked, as it had a width of 7 or 8 feet, and was in good repair. The view from it into the abyss beneath is superb. Numerous cascades, hundreds of feet in height, fall over the bare rock faces of the lower precipices. Issuing from glades hundreds of feet below the road, these cascades form a picture of great magnificence. From where they commence the mountains are more or less clothed in forest to their summits. Nothing can be seen or heard of the torrent that is eating its way into the strata far, far below.

Forty minutes' trotting on our mules brought us to a point whence the road, rounding a spur, dives zigzagging down the crumpled side of the gorge in the Hazar champ, or 1000 twists. From hence is obtained the loveliest of the many lovely views of the Chel-haus chasm. Thence it can be seen for some 20 or 25 miles of its length, viz. from the snow-clad watershed which marks the source of the river to the south, to beyond the Takht-i-Shah (which is hereafter to be described) on the north. Nothing in Kashmir, the Himalayas, or Switzerland resembles it. Maybe it may find a parallel in the rifts in California. Here, close to the road, a rough kind of pagoda has been erected to shelter the Shah when he comes this way, and entice him to stop and admire the loveliest scene in his dominions. Was this building the outcome of his Majesty's own wish, or the result of an inspiration on the part of the Austrian engineer who constructed the road some twenty-six years ago? The zigzags below the pagoda are so steep as to make riding impossible, and the excuse to dismount may be appropriately made, notwithstanding that a stout fence of stonework pillars, with wooden beams, now precludes all danger of falling into space. Towering isolated rocks, which here overhang the track, would each, in a more frequented country, have its distinctive name, and be recognized as the "Eagle's nest," the "Cathedral rocks," or the "Cheddar cliff," respectively. About half a mile below the pagoda a boring or tunnel, 15 feet in length, has been made in the live rock. Gasteiger Khan, the Austrian who built the road, apparently made the most of this, to the Persian mind, extraordinary feat in engineering. On the south side of the tunnel are two inscriptions; and a bas-relief in alabaster has been let into the eastern side. This slab represents his Majesty, Nasiru'd-din Shah, shooting from horseback at a leopard or lion, whilst hounds and hawks pursue other game both in the foreground and on the horizon. In the rear of his Majesty is seen an escort drawn up with military precision. On the north side and over the centre of the arch of the tunnel, Gasteiger has immortalized himself in a Latin inscription, setting forth his distinctions and titles. The strings of mules that bring charcoal, dried fish, and the main rice supply from Mazanderan and the shores of the Caspian to Teheran pass this way.

We soon got into less rocky ground, where the slopes are covered with forest of sycamore, oak, and hornbeam, with underwood of medlar and crab-apple. Butterflies flit about; a lovely large one with black wings is very remarkable. From far below is heard the chop, chop, chop, of the charcoal-burner, while a thin wreath of smoke marks the spot where his devastation is going on. In two places small rills of water cross the track, and here and there rude limekilns show where the stone had been burnt to make mortar for the pillars of the protecting parapet.

One hour and twenty minutes from the pagoda, and we are at the end of the next great spur, and 400 feet below the former. Here the zigzags begin again with a vengeance, and we decide to stop for breakfast. Gasteiger Khan has chosen this point as another suitable halting-place for royalty, and an elevated platform with a rude stone seat gives an excellent place to spread our carpet. The view from this platform (named the "Takht-i-Shah," or King's throne) is in its way as fine as that from the "pagoda." Looking up-stream, you seem to be absolutely in the centre of the valley or causeway. One thousand feet below, still invisible in its tortuous chasm, runs the course of the river. Picturesque precipices, fringed with forest, scored with cascades, and rich with verdure wherever grass can grow, lead the eye up to gentler slopes and park-like clumps accidentally spared by the charcoal-burner, whose fire is ever at work, but is unable to more than temporarily unclothe these verdant mountains. Such fairy glades and cool grots did we look into across the chasm! What a place for *shikar!* But what a chance of breaking your neck and of losing your quarry if you killed it! Whilst we were thus soliloquizing, the sound of three shots rang out from across the chasm, and the sense of distance and the vastness of the scene was brought home to us by the fact that our three pairs of eyes could not see the smoke of the shots, much less the game or the hunter. A passing peasant informed us that the sportsman was one Hidáyat by name, and that he was after ibex, of which he had killed two on the previous day. How this man had got news from such a distance, for there was no way nearer than round by Valiabad, was a puzzle to us. He looked too much a man *ingenui vultus* to have invented his facts for our benefit; yet, in spite of his manner and appearance, we very much doubted them. Looking down-stream, the rift is observed through which the Ogham river comes to meet the Chel-hauz, and the latter shows itself, a foaming white streak, for a few short twists of its madding course. There is no sign of a definite opening through which the river can escape to the sea; ridge interlocks ridge, and snow-capped mountains rise into the distant sky, apparently leaving no means of exit. After breakfast, our baskets were filled with hart's-tongue, spleenwort, *Adiantum nigrum*, and polipodium ferns. Many varieties of sedum were seen in bloom, one species being almost as large as a house-leek. Roman laurel and grass-fern were plentiful.

The morning of the 25th broke cloudless and bright. Two of our party were preparing to make an exploration seaward, to trace the egress of the waters to which our attention had been drawn, when the two shikaris of the Nasru's-Saltaneh arrived in camp with the news that they had marked two bears up-stream in the Shah's preserves, and that they were sleeping amid brushwood and tall grass in one of the mountain valleys, only a few miles from our recently traversed road. The information seemed so authentic, and the men who brought it gave such straightforward replies to our cross-questions, that all other arrangements were put aside in favour of a proposed bear-hunt. Accordingly, we filed out of camp, and took the road to the Keravend pass, revisiting the hill which had attracted us by its luxuriant flowers, but on the summit of which the main object was now a bevy of tawny-coloured vultures awaiting an opportune moment to assail the carcase of a horse. We were soon joined by the *Shikarchi-Bashi* and four beaters, or keepers of the royal preserves; but they professed ignorance as to the presence of the bears, and the first-named functionary took upon himself to deny the truth of the report about them. His action did not, however, shake our confidence in the veracity of the Nasru's-Saltaneh's men.

Having come out of the scrub on to the grass of the upper mountain slopes, we were sitting at luncheon by a stream, when our informants were seen to conduct the *Shikarchi Bashi* over a neighbouring crest; and ere we had completed

our repast by partaking of the conventional cup of coffee, one of them returned to announce that the bears were still in their old place. Our first impulse then was to toss for places and shots. We were four in number. Two, who had previously shot big game in India as "strokes," merely tossed who should accompany them. It was settled that "stroke" No. 1, with his "bow," should remain beside the ravine at the head of which the bears lay, and that "stroke" No. 2 and "bow" No. 2 should accompany the beaters, and, making a *détour*, head the game down the ravine. This was all very well to talk about, but when it came to going up the side of the mountain at anything like the pace the beaters set, "bow" and "stroke" Nos. 2 found it a most difficult proceeding. The young *shikari* Ali was leading at a prodigious pace, and had to be spoken to very roughly, even threatened with punishment, ere he would slacken it. At length it was evident that, if the ravine head was reached, "bow" and "stroke" Nos. 2 would be so blown that it would be hopeless for them to try and shoot; so they took up a position behind rocks commanding the brushwood clump where the bears were said to be lying, as well as the opposite slopes—in fact, similar to that occupied by "stroke" and "bow" Nos. 1, only some 250 yards higher up. Between the two positions, on the opposite slope, were other clumps of brushwood, and the bears were as likely as not to be in them. The energetic beaters were soon seen throwing stones into the brushwood, and for some moments without result. Then suddenly out dashed a lovely fluffy brown bear, and made for the waterway down the ravine. She was followed by a youngster of a year's growth, about the size of a large sheep-dog. In colour the young one was dark brown. The beaters caught sight of the youngster, though they had not seen the old one, and set up frantic yells. Immediately after breaking cover they were lost to view, but the old one soon reappeared, making straight for No. 2. "Stroke" No. 2, having won the toss for the first shot, waited till she was within 70 yards, where she paused and turned half round, apparently to look for the youngster. The beast was then hit hard in the shoulder, and eventually fell plugged with four more bullets than were necessary for her destruction. The youngster now appeared running across the stony side of the mountain to the left front. It was a difficult shot, as he was going a good pace and rather uphill. The result was he was missed clean, and by the time the guns were reloaded there was nothing to be seen but the ears of the beast as it crossed the ridge within easy range. The youngster pegged away gaily over the mountain, and was lost to view. The behaviour of the natives around us, when the dead bear was hauled out of the thicket, supplied a good illustration of the excitability of the Persian character. One youth completely lost his head, and it was only when our own servants arrived that we could get the carcase slung on a stick and carried to a mule for transport to camp.

The Persians had no idea of the meat or skin of a bear being of the slightest value, and it seems that when the Shah shoots one he throws the body, skin and all, into the nearest river, after having shown it to his wives and his other women. There was great difficulty in getting the beast skinned, but liberal *bakhshish* eventually prevailed. The *Shikarchi Bashi*, meanwhile, was taking the credit of the whole affair, and pointing out how well *he* had arranged the beat, and how that all presents that were to be made should be made through him. This meant that no one else would get a *sou*. Eventually by plain speaking he was subdued, and retired, not to appear again for the next three days, *i.e.* till there was a further chance of extorting lambs from villagers.

On June 26 two of our party started for our projected trip to Lower Mazanderan, past the pagoda, and down the Takht-i-Shah, a road already described beyond

the latter point. The face of the mountain is again rock, and the road twists round the contortions of the strata in a very ingenious way. About 3 miles from Takht-i-Shah, Gasteiger Khan seems to have run out of patience, or, more likely, of funds, for he makes a dash for the bottom of the gorge by zigzags such as no laden beast but a mule could get over. Just at the end of these a beautifully clear tributary joins the Chel-hauz on its right bank, and here we watered our tired animals. The river itself was disappointing; rushing and plunging as madly as ever, its turbid waters gave no prospect of fly-fishing, and it seemed doubtful whether even salmon could be hoped for. We had reached a new flora of fig-trees, alders, and elms, with thorny shrubs for undergrowth. Beside the river, patches of corn, ripe for the sickle, were being cut by men and women. The latter made no pretence of covering their faces, and their crimson or scarlet bodices and petticoats, though generally ragged, were extremely picturesque. As a rule handsome, they had, like most women condemned to hard work out-of-doors, a sad expression. Here the small fields were more or less fenced; and the mountains, less precipitous than at Hazar Champ, were clothed with forest to their summits, except where patches of cultivation occupied moderately level spurs. Now and again the encampments of the reapers, hard by the boiling river, showed where they ate, drank, and slept in the open, a tree felled by fire forming a bridge of ingress and egress with some otherwise isolated field. At the foot of the Hazar Champ, the Ogham Rud falls into the Chel-hauz. Up the rocky valley of the former river there is a road to the mountainous district of Hazar Be-ar.

Three miles below the aforesaid confluence of the Ogham Rud, the Maka Rud, with its gentle current, falls in on the left bank of the main river. The Maka Rud valley is most picturesque, more cultivated and less rugged than any we have yet seen. Half a mile below the bridge that crosses this tributary, a green sward hard by the river, with a lovely view in front and picturesque rocks behind, lured us to encamp. Here two alder trees, the one from the right bank having fallen over, as it were, into the arms of the one on our side of the river, formed the piers to a rustic bridge, leading to a small farmer's homestead or huts.

Whilst our tents were being pitched, we crossed over to eat our lunch under the shade of these trees, and were soon joined by a ragged but picturesque individual, who gave us a *salám* of welcome, and showed great interest in our proceedings. He, like all Mazanderanis, was of more civil and gentlemanly instincts than the ordinary Persian. Being one of the landed proprietors of the district, we dubbed him the Laird of Rudbarek, from the name of his domain. He was one, he said, of three brothers who had inherited the freehold of the mountains on either side, and of the cultivated ground on both sides of the river below the confluence of the Maka Rud, and that they paid taxes to the Nasru's-Saltaneh. The Laird was now threshing and winnowing his crop of barley, and anxious to sell us forage, milk, and butter-milk. If only he had been better clad and cleaner, our friend would have been quite an enviable personage. Accompanying us as he did during the remainder of that day and the greater part of the following, we got to know him very well. Indeed, from the first he seemed to have no reserve with us, and we treated him accordingly; moreover, as he was a keen sportsman, we had many subjects of conversation in common. He had shot bears close by his domain, and followed the Mazanderan stags every winter, when they were driven down from the upper ranges. Looking at the lovely glades high up on the mountain-side, he pointed out spots where he had killed extra fine animals, with antlers of twelve points, and more. Strange to say, he knew nothing about preserving skins, and the fact that they could be utilized as a warm covering for himself and children seemed to him quite a revelation. Stags' horns, he said, were in demand, and

hucksters came round regularly to buy them, as well as salted salmon. He was much interested in our rods, flies, minnows, and tackle, and quite expected to see us haul out lots of fish, though August, he admitted, was the time when the rivers get clear and the pools yield their supplies, whether to the spear at night or to line by day. No hooks on lines are used on these occasions. The Laird said that he got on an average sixty salmon a season, varying from fourteen to twenty-five pounds each. We started whipping the milky waters of the river as soon as the sun got behind the mountains, our native friend showing us the pools where the salmon lay, and the spots where the brushwood and trees along the bank would allow of a fly being thrown. These two requirements for success did not often coincide, and the Laird looked quite crestfallen when told that some deep swirl was unapproachable with a fly. At length, as a fly would not entice, a minnow was put on, and the ground gone over again. Just as it was beginning to get dusk, at a lovely spot where the river, passing a huge rock, formed a magnificent run, a fish was hooked. The Laird, though delighted that this proof of his veracity had at length been vouchsafed, was not a bit over-excited, managed the landing-net like an old hand, and eventually brought a salmon trout to bank, weight about fifteen ounces. The fish was free when landed; probably it was accidentally hooked, and had not seen the minnow in the turbid water. In any case, it was the first salmon trout that had been killed with a rod in a Persian river flowing into the Caspian.

The next day, the 27th, we made an expedition northwards, down the river for a two hours' sharp ride. The scenery was magnificent. The river, ever headlong, had a more open valley, allowing of groves of stately alders here and there. The cultivation climbed higher up the slopes. Villagers in all directions were gathering the harvest, and stacking the corn on platforms raised to such a height that the cattle could find shelter underneath, whilst the straw could not be stolen. Wild grape-vine, figs, and pomegranates were in all the nooks, from which rills of water in many places crossed the road. Thick hedges of thorny stuff guarded the way on either side, and gave an impression of there being some sense of care and industry in the tillers of the soil, though this was dissipated by the sight of clumps of thorns dotted about amidst the crops. This charming foreground was even surpassed by the more distant views. We could now see far above the mountains that shut in the river. On its right bank forests clothed them as far up as the snow and cold of winter permitted. Above the forests grassy rounded slopes, fit pastures for deer, ibex, and moufflon, carried the eye to summits where snow still clung even in the month of June.

On the left bank the country was less steep, so clusters of mud huts could be seen here and there. Veritable snowy ranges formed the background far away to the south.

Further north, as the valley opened out the vegetation became more sparse, as though we had reached a belt where the rain-clouds seldom touched, but passed over to break on the higher ground. Further still away to the north, thick forest was again visible, clothing all the mountains, which rose to a considerable altitude. We lunched in a grove of ancient alders on an island in the river near to the mosque of Bandi, with its roof of picturesque shingle, showing we were near a forest land, and one where the ordinary mud roof of Persia was unable to cope with the rainfall.

Reluctantly we returned northwards; time would not permit of our pushing down to the sea. That evening a try was again made for fish, but without success. The 28th found us climbing up the Hezar Champ, and a terrible climb it proved. The black butterflies were gay as ever, and a Bohemian wax-wing visited us at lunch, which we ate in the shade of Gasteiger Khan's tunnel.

That night we pitched our tents near our former camping-ground of Valiabad, and the next day pushed over the Kendevan pass and down the Laura valley to

where the Sheristanek falls into it at Doab. The next morning the *Shikarchi Bashi* appeared, but not till one of our party had started over the mountains by the short cut for home, hoping to get a shot at ibex on the way. The rest of us were honoured with a full parade of lambs at every village through which we passed, and on July 1 we reached our homes at Gulahek.*

THE MONTHLY RECORD.

THE SOCIETY.

The New Session.—The first meeting of the New Session will take place on Tuesday, November 10. It was hoped that Dr. Nansen might have been able to come to England and open the session with an account of his remarkable expedition. Unfortunately, he will not be able to leave Norway till towards the end of January, when it is expected that he will address the Society. The first paper of the session will be an account of the expedition under Mr. Jackson, which is pushing its way and carrying out scientific observations in Franz Josef Land; the paper will be by Mr. Arthur Montefiore Brice, as will be seen from the programme inserted in the present number. This will be followed before Christmas by papers on Uganda and Unyoro, by Lieutenant S. Vandeleur, and on the Sources of the Niger by Colonel J. K. Trotter. Other interesting papers, as will be seen, are in preparation for the meetings after Christmas. During the session special meetings will probably be held in connection with the 400th anniversary of the voyage to America by Cabot and of the route to India by Vasco da Gama. For other special features reference is made to the Programme.

Special Medal to Dr. Nansen.—At a recent meeting of the Council, it was decided to award a special gold medal to Dr. Fridtjof Nansen, in recognition of the value of the geographical and other scientific work which has been accomplished by his North Polar Expedition. Dr. Nansen has already received a Royal Medal from the Society.

EUROPE.

Geographical Work in Finland.—The Finnish Geographical Society at Helsingfors has recently sent us their publications for the years 1894, 1895, and 1896, which show a record of solid geographical work of a very satisfactory character. There appears to be an awakening to the value of geographical study in Finland, which is accompanied, not only by the production of such memoirs as the volumes under notice contain, but by an earnest effort to adopt whatever is good in the geographical teaching of other countries in the schools of Finland. The papers in the *Vetenskapliga Meddelanden af Geografiska Föreningen i Finland* are

* For a general illustration of the country traversed by Colonel Wells, the reader is referred to map of a Route along the Alburz Mountains, between Tehran, Astrabad, and Shahrud, by Lieut.-Colonel Beresford Lovett, R.E., to be found at page 120, vol. v., *Proceedings* (New Series) of the Royal Geographical Society. The section of country now treated may be identified by the names Gatchasir and Waliabad on that map, and is between long. 51° and 51° 40′.

published in the Swedish language, with a German abstract. Thus, as in the memoirs of the Hungarian Geographical Society, which publishes French or German abstracts, the subject of the papers can be at once perceived by the scientific men of Western Europe, and a full translation can be undertaken when the importance of the memoir seems to warrant it. Much inconvenience would be saved, and the labours of geographers would be simplified, if other societies published in little-understood languages would follow the same example. It would be an excellent rule if every scientific paper not printed in English, French, or German were accompanied by an abstract in one of these languages. A. Thesleff gives a description of the sand-dunes of Eastern Finland, where they are increasing rapidly on account of the destruction of forests. The maximum height of these dunes is from 70 to 80 feet, and they are much less covered with vegetation than the dunes of other countries. J. E. Rosberg describes the sand-dunes of the eastern shore of the Gulf of Bothnia, which have been very little studied. All the dunes are found in the neighbourhood of rapid rivers carrying much sediment, and as a rule on the south side of the river-mouth, because of the prevailing northerly wind. They stretch in most instances in parallel chains along the coast, with lagoons between the ridges. The greatest height observed was about 65 feet, and the onward movement amounted to a little over 20 feet per year. The formations were found frequently at a considerable distance inland, up to 15 miles from the sea. The same author gives a long memoir on the deltas of the northern part of the Gulf of Bothnia, tracing the changes which have taken place in many of them in historic times, and endeavouring to arrive at a theory of delta-growth on a coast which is rapidly rising. He recognizes four main types: (1) True "Scheeren deltas" with widely distributed alluvium, like that of the Kyröelf; (2) partial "Scheeren deltas" with numerous false deltaic islands, like the Torneelf; (3) submarine deltas freshly upheaved to the surface, like that of the Uleelf; and (4) true submarine deltas not showing on the surface, like that of the Kalajoki. The memoir is fully illustrated by plans of a large number of Finnish deltas. R. Hammarström describes with maps the depth of Lake Lappajärvi, and R. Boldt that of Lake Lojo: the former lake, although larger and deeper, closely resembles Derwentwater in its bathymetrical type; the latter appears to form a deep uniform basin, surrounded by a wide shallow rim bearing numerous islands. R. Hult deals with the distribution of timber-trees in Finland, and R. Herlin elaborates the palæontological plant-geography of northern Satakunda.

Ancient Topography of the Étangs de Hourtin and Lacanau.—An interesting paper by M. Dutrait has recently been published in the *Bulletin* of the Bordeaux Society of Commercial Geography, on the ancient topography of the lagoons (étangs) of Hourtin and Lacanau and the probable position of the ancient port of Anchises, Department of Gironde. The results of the discussion are as follows: (1) The ancient coasts of Aquitaine were cut up into gulfs. (2) These gulfs have been obstructed and changed into lagoons, or lakes, owing to the deposition of the sands on the coast, arising from the destruction of soil resulting from forest clearing, and by the subsidence and erosion of a large island which formerly lay off the shore. (3) The lagoons of Lacanau and Hourtin, by their level, depth, and other details of their topography, agree exactly with this general rule. (4) The port of Anchises mentioned in 1538, in use until 1700, but which disappeared in 1770, was situated on a considerable estuary, the northern outflow of the Étang de Hourtin; the position of the mouth and the direction of the estuary are well known. (5) The village called Anchise was built on the edge of the marsh of Belsarieu, where the waters of the outflowing stream are lost from sight, being buried under the dunes to the south-west of the forest of Brisquette, the

advance of which had obstructed the outflowing water. (6) The Étang de Lacanau has had two outlets, one to the north, the Trou-du-Fer, the other from the centre, the Port Saint-Vincent, whose position on the coast is exactly determined. The author adds that the name Balania, which he finds is derived from the celtic word *balan* = broom plant, occurs on many old charts in place of the name Anchise; and that the dunes to the south of the mouth of the Anchise bear the name "les Genêts" (*i.e.* brooms).

ASIA.

Exploration of the Amu-daria.—It appears that during the stay of the Khan of Khiva at Moscow at the time of the coronation of the Czar, it became known that the Amu-daria had again begun partly to flow in the Uzboi, since a dam, which directed all its waters into Lake Aral, had been destroyed by the inhabitants of the khanate of Khiva. The great river has already reached and partly filled up the Sari-kamish depression, which is situated, as is known, to the south-west of Lake Aral. Consequently, General Glukhovsky, who for years has devoted his energies to the scheme of diverting the Amu into the Caspian Sea, and has published a detailed work on this subject ('The Diversion of the Amu-daria into its Old Bed leading to the Caspian Sea, and the Acquisition of a Water-communication from the Frontiers of Afghanistan to the Caspian Sea, the Volga, and the Baltic Sea,' St. Petersburg, 1893), has induced the two ministries of War and Communications to send out a new expedition to explore the present possibilities for such a canal. The last telegraphic news is to the effect that General Glukhowsky is already on the banks of the Amu, and a full report of the present state of the river is soon expected.

M. Bonin's Journey in South-Eastern Tibet.—An important journey of exploration in the region between the upper Yangtse-kiang and its tributary the Yalung-kiang has lately been carried out by M. Bonin, French vice-resident in Tongking (*Comptes Rendus*, Paris Geographical Society, 1896, pp. 234, 250). South of the main route from Peking to Lhasa this region had remained unvisited by Europeans, and in great measure even by the Chinese themselves. A surprising result of the journey is the discovery that below the sharp angle made by the Kinsha near the town of Li-kiang (at which angle Captain Gill finally left the stream on his journey to Tali-fu in 1877), it makes a wide sweep to the north, joining the Yalung in about 28° N. lat. instead of 26° 35', as has been hitherto supposed. The stream which has been considered as the Yang-tse, and which was crossed by Mr. Hosie under that impression in 1883, turns out to be merely a small tributary. The current delineation of the river has been derived from D'Anville's map, but as the agents employed by the Jesuits in their survey of China were unable to penetrate into these wild regions, that map was based (for his particular section of the country) on vague reports only. From Tali-fu M. Bonin proceeded north to Li-kiang, which town he was the first European to visit. Hence, instead of crossing the Yang-tse by the iron bridge over which passes the route to Yong-pe, he turned north-west, and crossed over to the left bank at the sharp angle above referred to. Before finding a route across the precipitous mountains which bound the stream on the north-east, M. Bonin was obliged to ascend the stream for several days. The plateau of Tsong-tien was at last reached by a snow-covered pass 14,500 feet high, and a terribly rugged and difficult path led thence to Yunning-tu-fu (Yung-ning). During the last day's march the traveller looked down on the Yang-tse flowing below in a deep gorge.* Yunning-tu-fu,

* M. Bonin did not, therefore, trace the river continuously during its northward sweep, but it is to be supposed that he did not fall into the error (otherwise attributable to Mr Hosie) of mistaking a tributary for the main stream. Is it just possible that a bifurcation takes place, such as was hinted at in a neighbouring region by Garnier? (see Yule's introduction to Gill's 'River of Golden Sand,' p. [107], (abridged edit.).

about which hardly anything has been known hitherto, is peopled by a mixture of Chinese from Yunnan, Kutsongs, Mosos, and Sifans. North of this town the explorer traversed the Tibetan kingdom of Meli, into which the Chinese even have never penetrated. It is entirely in the hands of the yellow lamas, to whom the king himself belongs, and is known to the Chinese on this account as Huang-Lama ("yellow lamas"). The lamasery (placed on the side of a mountain) was composed of three-storied houses with white walls, balconies, verandas, etc., which recalled a town of South Europe. From Meli M. Bonin crossed the Yalung, and made his way over several very high passes to Ta-tsien-lu.

AFRICA.

Captain Bòttego's Expedition.—Letters describing the progress of Captain Bòttego's Expedition to Somaliland down to March last have been published in the *Memorie* of the Italian Geographical Society (vol. vi., 1896, p. 149). The leader himself writes, first from Lugh, the important Somali town on the middle course of the Jub, and afterwards from a point a little south of the Daua river, in about 40° 40′ E. long. Captain Ferrandi also writes from Lugh, where he has remained as chief of the newly founded Italian station. From Brava the route (shown on two sketch-maps accompanying the letter) led first westwards to the Webi Shabeli; then northwards to the district of Baidoa, where the population is said to be more dense than in the most thickly peopled parts of the valley of the Po (apart from the large cities); and thence again west to the Jub, or Ganana, at Lugh. Baidoa forms a perfectly level plain, about 1650 feet above the sea, with a soil devoid of pebbles, producing abundance of durra and cotton. Lugh had been attacked by a band of marauding Amharas (who had come from Imi by way of the Web) shortly before the arrival of the expedition, and the inhabitants had abandoned the place. They returned after Captain Bòttego's arrival, but the prevailing feeling of insecurity had prevented the arrival of the usual caravans from the Benadir coast for the interior. The country between the coast and Lugh is partly composed of red sandy clay, rich in magnetite, and occasionally mixed with fragments of crystalline rock, and partly of grey or yellowish strata. The former is covered with trees and thorny scrub, with little grass, while vegetation, and especially grass, is much more abundant in the grey soil. Beyond Lugh the expedition followed the south bank of the Daua for some distance, afterwards diverging from the stream and ascending the plateau to the south. Along the Daua the strata were generally horizontal, and seemed to represent an old sea or lake bottom. Salt is found over the whole district, especially east of the Web river, where is a mine, near which ruins of an ancient city were reported. Captain Bòttego heard frequently of a river named Sagan, in the direction in which he was marching. This river is said to flow into a lake (not Abbaia), and to be distinct from the Omo. The Amhara Burgi dwell on its banks. Meteorological observations have been made throughout by Captain Bòttego, who gives the broad results in his letters.

French Expedition across Equatorial Africa.—The two French travellers, M. Versepuy and Baron de Romans, have accomplished a journey across Africa from east to west by way of Lake Albert Edward and the equatorial forest (*Revue Française*, September, 1896). Their original intention had been to reach Mount Kenya and Lake Rudolf, but, the road in this direction being closed by hostilities with the Masai, they were obliged to change their plans. After leaving Katue, on Lake Albert Edward, they came into collision with hostile natives. Through the forest—in which they suffered severely from fever—they appear to have, on the whole, kept to Stanley's route, though in the reverse direction. We regret to state that M. Versepuy succumbed at Chantilly, soon after his return to

France, to dysentery, contracted during the journey (*Mouvement Géographique*, No. 36).

French Steamer for the Shari.—M. Gentil, who is proceeding to the Shari basin by way of the Ubangi, taking with him a small steamer in sections to place upon the former river, has, according to the September number of the *Bulletin du Comité de l'Afrique Française* (p. 275), been delayed for some months at the station of Krebeje, founded by him in 5° 46′ N. lat., on the banks of the Tomi, an affluent of the Kemo, itself a northern tributary of the Ubangi. M. Gentil proposes to make for the Nana (a southern tributary of the Gribingi, explored by Maistre), on which he hopes to launch his steamer (see also *Revue Française*, 1896, p. 492).

The French in the Niger Basin.—The *Bulletin du Comité de l'Afrique Française* (1896, No. 8) contains the account of a journey in the west of Borgu by M. Deville, who, early in 1895, was commissioned to visit the district of Buay, which had not been reached by the French expeditions of 1894-95 to the region north of Dahomé. According to M. Deville, Borgu is composed of several independent kingdoms, of which Buay is one. The chief town is placed by him about 50 miles north-west of Niki (visited by Captain Lugard), and the kingdom is said to extend from 10° to 12° N. lat., and from 2° 20′ to 4° 20′ E. long. It lies on the watershed between the basins of the Weme and Niger, the line of partition nowhere attaining a greater altitude than from 1300 to 1650 feet. There are some forests on the side towards the Niger, but elsewhere the surface is covered with tall grass, interspersed with *karite* trees, and supplies pasturage for the flocks of the Fulah herdsmen. It is furrowed by many streams, which mostly dry up during the hot season, but enough moisture remains in the soil (which is very fertile) to admit of cultivation. The natives possess a small but active breed of horses. M. Deville thinks that the name Adafudia, given by Duncan as that of the chief town of this region, may be composed of two words used in the country as an expression of contempt, the meaning of which was misunderstood by the English traveller.

AMERICA.

Mr. Fitzgerald's Expedition to the Chilian Andes.—Mr. E. A. Fitzgerald, who recently returned to England from his expedition in the New Zealand Alps, has started on a fresh journey, the main object of which is the ascent of Aconcagua the highest summit of the Andes. The expedition consists of ten persons in all—Mr. Vine, geologist; Mr. de Trafford, surveyor; Mr. Philip Gosse, naturalist; and Mr. Fitzgerald, with guides and servants. From Buenos Aires, the party will proceed by railway to Mendoza. Here they will commence the ascent of the mountains, making direct for Aconcagua, and afterwards for the side valleys of the Andes. The objects of the expedition are scientific, and the ascent of the mountain will be made in a leisurely manner. Mr. Fitzgerald's object is to watch the effect of the various altitudes on the system, and from this to see whether it is possible to climb higher peaks in the Himalayas.

Project for a Route from the Amazons to Cuzco by way of the Purus.—The distance from the headwaters of the Purus to the left bank of the Amarumayu, or Madre de Dios, is about 90 miles. The advantage of such a route would be that there are no rapids on the Purus, as is the case on the Madeira. It is proposed by M. A. Pimenta Bueno that the mixed Commission which is to fix the Peru-Brazilian boundary-line between Madeira and Yavari, should also be instructed to explore the country between the headwaters of the Purus and Aquiry, and the left bank of the river Madre de Dios.

Explorations in the Argentine Republic.—On May 15, 1896, Dr. F. P. Moreno, director of the Muséo de La Plata, returned to Buenos Aires from his great journey of exploration begun in January. In December last year Dr. Moreno had sent out from Mendoza several expeditions composed of twenty-six engineers, geologists, botanists, and cartographers for the exploration of the districts bordering on the Andes lying to the south. He himself followed in the middle of January, and traversed the country between Mendoza and 47° S. The route followed was across the Rio Grande and the Colorado to Chos-Malal, the capital of Neuquen, thence to Codihue, to the Rio Bio-Bio, across the Collon Curá to Junin de los Andes and the lakes of Nahuel Huapi, Lacar, Caleufú and Miaten. These explorations complete a series begun about the end of 1894 on the Bolivian frontier, in the course of which 25,000 miles have been travelled over by the various expeditions. The collections, of the most various kinds, fill 400 chests, and 2000 photographs have been taken. The territories of Neuquen, Rio Negro, and Chubut have been explored and surveyed with special care. Dr. Moreno is convinced that the much-talked-of but still unidentified Bariloche pass lies on the Lago de Gutierrez. North of Lago Nahuel Huapi eight new lakes have been discovered, and fifteen south of it. The mysterious Rio Teteleufu is now accurately known from its source. In many places it has a depth of more than 25 feet. The beauty and fertility of the neighbourhood of Nahuel Huapi are much praised, and it is stated that a brilliant future awaits this tract as soon as it is connected with the east coast by a railway.—Dr. Polakowsky in *Petermanns Mitteilungen*, 1896, No. 9.

POLAR REGIONS.

Mr. S. A. Andrée's Polar Expedition.—In the last issue of *Ymer* (1896, Häft 3), Mr. S. A. Andrée publishes a report on his balloon expedition to Spitzbergen. It is known that the *Virgo*, which had on board, besides the balloon expedition, a party of geologists and zoologists, left Tromsö on June 14. After the steamer had called at Isfjord, and next at the Norway islands, a suitable place for building the balloon-house was found, on June 23, on Danes' island. It took nearly one month to land the balloon and to build a house for filling it. It was ready on July 20; the filling of the balloon began on July 23, and in the evening of July 27 the balloon was filled and ready to start. But the expected winds from a southern quarter did not come, and on August 17 the expedition had to pack up the balloon (the ship was freighted till August 20 only), and it started on its return journey on August 20, reaching Göteborg nine days later. From a table of the directions and force of the wind, from July 27 to August 16, which is given by Andrée, it appears that during these three weeks the wind blew chiefly from northern quarters, or was very feeble and changing. Only on July 29 and 30, and next on August 2 and 3, was there for a few hours a feeble southern wind, which, however, changed in the afternoon to a wind from the north or north-east. It appears, moreover, from the journal of Captain H. C. Johanessen, who cruised north of Spitzbergen during the same time, that, with the exception of August 9, when a fresh wind blew for a few hours from east-south-east, and the next day when a feeble south-east, with snow, was felt, the wind was always from northern quarters. Andrée explains at length why he did not take advantage of these short hours, the chief reason being that these winds were too feeble to carry the balloon, with its guide-rope, any distance northwards. The idea of taking advantage of any wind for a polar balloon-journey evidently was also discussed, but was abandoned because it offered relatively little interest, and because all probabilities were in favour of the balloon being lost, if landing took place, as it probably would, in some uninhabited spot. The loss of the balloon would have raised the costs of a

new expedition to 106,000 kroner, while now, the balloon being in working order, the costs of a new expedition would not exceed 53,000 kroner, provided that the next year's expedition is taken to Spitzbergen on board a ship of the Swedish navy. Mr. Andrée fully believes in the possibility of such an expedition, if only the balloon-house is ready earlier in the summer. There was no lack of southern winds in the earlier part of the stay at Danes' Islands. This year's expedition is not quite fruitless. It has proved the possibility of a balloon being filled in Spitzbergen, and of a pigeon-post being established between Spitzbergen and the Continent, while astronomical, magnetic, and meteorological observations were made, as well as geological explorations under Prof. De Geers, and hydro-geographical measurements under Prof. Arrhenius. At the same time Mr. Grönberg has made good natural history collections.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Vertical Distribution of Snow Plants and Habitations.—Two papers on vertical distribution, by pupils of Prof. Ratzel, appear in the second volume of the *Wissenschaftliche Veröffentlichungen des Vereins für Erdkunde zu Leipzig*. Dr. Magnus Fritzsch gives the following figures (English feet) as the results of his survey of the Ortler Alps:—

Exposure.	N.W.	W.	S.W.	S.	S.E.	E.	N.E.	N.	Mean.
Snow-line, climatic...	9510	9840	10,070	**10,130**	9780	9750	9370	*9360*	9720
„ orographic	8330	8620	9000	**9040**	8940	8630	8420	*8310*	8630
Trees	**7620**	7420	7600	7350	7410	7340	*7110*	7280	7390
Woods	7000	7070	**7080**	6990	6960	6960	*6640*	6890	6950
Shepherds' huts ...	—	*6675*	**7680**	7150	7410	7070	7310	6880	7180
Cattle-tenders' huts...	—	6540	**7070**	6670	6290	6290	*5760*	6040	6400
Meadow hay ...	5290	5700	**6920**	6510	5840	5630	5670	*4840*	5800
Cereals	*3960*	4660	**5390**	5340	5120	4660	4020	4080	4560
Permanent habitations	3890	4930	**5460**	5200	4920	4120	3860	*2760*	4520

The south-western and western slopes of the mountains are the most favourably situated, as is indicated by the bolder figures, which show the maximum height of each line; while the figures in italics, denoting the lowest position of each line, are found for the north-eastern and northern slopes. The orographic snow-line is "the line which joins the wreaths of snow protected by their position and the nature of the surrounding ground." It is interesting to compare these figures with those obtained by Dr. Hupfer for Etna. In summer some wreaths of snow lie on the mountain, as they do on Ben Nevis in our own country, although its summit is below the climatic snow-line. On Etna, in 1893, there were five small snow-wreaths on the north-west, north, and north-east of the summit plateau, between 9000 and 9900 feet. Dr. Hupfer gives the vertical zones of the mountain as follows:—

III. Waste region { (*b*) Snow-wreath region. (*a*) Pasture region (8850 feet).
II. Forest region { (*b*) Summer-green or birch region (6560 feet). (*a*) Ever-green or pine region (6070 feet).
I. Cultivated region { (*b*) Summer-green cultivated plants, and upper limits of agricultural region (5080 feet). (*a*) Ever-green cultivated plants, and upper limits of the olive (2620 feet).

It would appear that the forest limit is somewhat lower on Etna than on the Ortler Alps, while agricultural operations are carried on only about 500 feet

higher on the slopes of the volcano, despite its more southerly and insular position, which may be partly explained by the dryness of Sicily during the warm months. The beautiful map which accompanies Dr. Hupfer's paper shows that the distribution of trees is neither so high nor so extensive as it was seventy years ago.

GENERAL.

Population Maps.—In the second volume of the scientific publications of the Leipzig *Verein für Erdkunde* there are two papers on the distribution of population, one on the kingdom of Saxony, by Dr. Richard Buschick, and the other on West Central Africa, by Dr. Vierkandt. The former is of especial interest from the map, which shows the distribution of the people by using various symbols for small settlements, and various combinations of thin and thick lines which follow the boundaries of the settlements, whose areas are large enough to be traced. The map is fairly effective, and gives more precise information than that constructed on the usual plan of colouring the chosen political region according to the average number of inhabitants per unit area. In the case of a large-scaled map, such as that given for the Zwickau district, the white space is actually uninhabited. The value of these maps would be enhanced if the space inside the lines bounding an area of settlement were shaded or coloured to show the average density of the population per unit area, as well as the approximate number of inhabitants within these lines. The large number of villages with between twenty and two hundred inhabitants, and their regular distribution on the lower lands, is in marked contrast to the relatively much greater number of single settlements and larger villages in the mountains. It is interesting to compare these maps with that constructed by Mr. Bosse for the Royal Scottish Geographical Society's beautiful *Atlas of Scotland*, recently prepared and published by Mr. Bartholomew. In this map the country without any permanent inhabitants has been outlined and left white, and the density of population below this line calculated for each parish and indicated in the usual way. In addition, the number of inhabitants in each town has been indicated by special signs. This makes the map exceptionally graphic and precise in the way it presents population statistics. On comparing this with a contour map, it is seen that comparatively few inhabitants live permanently above 500 feet in Scotland. Dr. Vierkandt's population maps of West Central Africa are constructed in the usual way. The data, however, are very defective, and the author has usually to rely on the qualitative estimates of travellers. These differ according to the ideas of their authors, which are usually affected by the nature of the country previously traversed. The explorer coming from the desert is likely to term a region thickly inhabited that another, after passing through the populous parts round the lower Niger, would call thinly settled. The result of a critical discussion of the available information leads Dr. Vierkandt to conclude that ordinary estimates of the population of West Central Africa are too high, and he reduced Prof. Supan's total of nearly 37 millions to nearly 24 millions. With this alteration he points out that the total number of inhabitants in Africa, as estimated by Prof. Supan, is about 150 millions.

Place-Names.*—Besides a glossary of 266 pages, containing compact and interesting explanations of a number of well-selected names from all parts of the world, this new work by Canon Taylor contains a prologue of 35 pages, discussing and expounding many points of interest with reference to place-names, and an appendix

* 'Names and their Histories, alphabetically arranged as a Handbook of Historical Geography and Topographical Nomenclature.' By Isaac Taylor, M.A., etc., Canon of York. London: Rivington, Percival & Co. 1896.

of 88 pages, in which the elements most commonly met with in Indian, Turkish, Magyar, Slavonic, French, German, and English names are treated of. The last section is naturally the fullest. It extends to 46 pages, and is divided into five sections—on names containing survivals of grammatical inflection; on personal names; on names indicating occupations and status; on names of hundreds, shires, and parishes; and on those of towns and townships. This plan of relegating much of the matter to an appendix has many recommendations. It not only saves space, but it makes the subject dealt with more interesting and instructive. It ought, however, to be supplemented by an index containing references, both to the elements of names treated of and to the names explained or given as examples. In the prologue, curiosity is roused again and again about names about which no explanation is given in the glossary, at least under the names in question, and which cannot be found in the appendix (if they are there at all) without a long search. It is also to be regretted that there is no section in the appendix dealing with Celtic names in general, or Scotch and Irish names of Celtic origin in particular.

Geological Survey Report.—The Annual Report of the Geological Survey and Museum of Practical Geology for 1895 is a record of steady progress and much useful work. It contains the usual summary of work accomplished during the past year, to which every geographer studying a special region should refer. Perhaps the most interesting item in the report is the announcement that the half-crown machine-coloured geological map of the London district, on a scale of 4 miles to the inch, has sold well enough to justify "the expectation that the same system may be continued and extended." The issuing of geological maps at a reasonable and not prohibitive price will help geographers in every district, and we hope that the department will soon issue fresh sheets at a similar cost.

Popular Geography in Manchester.—At the Liverpool meeting of the British Association, a paper by Mr. J. Howard Reed was submitted, describing the work of the "Victorians," a number of members of the Manchester Geographical Society who deliver popular lectures free of charge. During the past five years over three hundred lectures have been delivered in Manchester and the surrounding districts, and over ninety thousand hearers have been reached. The audiences are principally of the working class, but also include the members of many well-known literary and scientific clubs, and students of continuation schools. The lectures given include such titles as: "Shaping of the Earth's Surface by Water-action," "Map Projection," "India," "China, Korea, and Japan," "Polar Exploration," "Across the Rocky Mountains," "Canada," "Across Africa with Stanley," "Uganda," etc. Applications for lectures are made to an honorary secretary, who conducts all correspondence and makes arrangements with the local societies and the lecturers. The engagement of the halls, printing, and similar matters are carried out on the spot by the local people. This system has proved so satisfactory, and the enthusiasm of the voluntary workers has been so well maintained, that no hitch has ever occurred. The terms on which the lectures are given are very simple. Any member of the Manchester Geographical Society or any affiliated society is entitled to apply for lectures. Lantern apparatus and volunteer operator are supplied when required. A nominal fee is charged for each lecture, travelling and lantern expenses being added when incurred. Any balance in hand at the end of each season is applied to the upkeep of lantern plant and the making and purchase of new slides. Another important branch of voluntary work consists in the analysis of some two hundred British and foreign scientific journals. This is most useful for scholars and students. It enables them to follow up, with ease, the literature on any special subject.

OBITUARY.

Baron Sir Ferdinand von Mueller.

We learn with much regret of the death of Baron Sir Ferdinand von Mueller, K.C.M.G., F.R.S., the eminent Government Botanist of Victoria, Australia. For nearly half a century Von Mueller's name has been intimately associated with the progress of science and exploration in Australia, and especially with the development of its vegetable resources. He was born at Rostock, in Germany, in June, 1825, losing his parents at an early age. He obtained a training in pharmacy, and in his leisure time devoted himself to the study of botany and chemistry. In 1846–47 he studied at the University of Kiel, where he took the degree of Ph.D. For several years he investigated the botany of Schleswig and Holstein. In 1847, in order to counteract a hereditary tendency to phthisis, he emigrated to Adelaide, in South Australia, where he commenced his career as assistant to a chemist, and during the following four years devoted himself to the investigation of the flora of the colony. From 1848 to 1852 he travelled over 4000 miles, mainly for botanical purposes. In 1852 he was appointed Government botanist to the colony of Victoria by Mr. Latrobe, the first Governor, and here he at once entered upon the labours for the exploration of the continent and development of its vegetable resources and capabilities that only ceased with his death. From this year dates also his series of publications on the botany of Australia, which in extent and value represent no small proportion of an Australian bibliography. In 1855–56 he accompanied as botanist the expedition under the command of A. C. Gregory for the exploration of North and Central Australia, and was one of the four to reach Termination Lake in Central Australia. Some 6000 miles of previously unknown land was traversed, and abundant collections made of the various forms of vegetation. On Mueller's return to Melbourne he was appointed Director of the Botanical Garden of that city. Whilst rendering immense services, not only to Australia, but to many other countries, he failed to satisfy the wishes of the colonists for a garden which should, like Kew, be as ornamental as useful. Mueller was neither a practical horticulturalist nor a landscape gardener, and the Victorians, seeing with envy in the capital of a sister colony (Adelaide) the erection of a garden as æsthetic as scientific, relieved him of the directorship of the garden, at the same time, with rare liberality, retaining him in the position of Government botanist, with undiminished salary, library allowances, and appliances for pursuing his labour in scientific and economic botany.

Though mortified almost beyond endurance by this action of his fellow-colonists, Mueller, with undiminished zest and liberality, continued his exertions as their benefactor to the day of his death. He was the introducer into Australia of many useful plants from other regions, in exchange sending abroad plants native to Australia of more or less economic value. He had a leading hand in introducing that most useful of Australian trees, the eucalyptus, into Algeria, India, the Riviera, and other countries, in some of which it is of essential service as timber and fuel, and in others as an aid in draining marshy land. He was the first to raise the great *Victoria Regia* water-lily. Indeed, his immense knowledge as a botanist had almost always a practical end in view, and not a few Australian industries are largely indebted to him for their development. It was also partly due to his suggestion that the camel was introduced into Australia and first used for exploring purposes in 1860. His own travels in Australia for botanical purposes, on foot and on horseback, covered some 25,000 miles. After he himself had ceased, owing to

his official duties, to be able to travel, he had a directing hand in many of the important expeditions that went out from Victoria as well as other colonies.

In recent years Baron von Mueller was actively interested in the promotion of Antarctic exploration, and was greatly disappointed that the efforts made, both in this country and in Australia, proved futile. He was a voluminous author, but his writings are mostly of a strictly scientific character. The titles of over a hundred papers by Mueller are given in the Royal Society's catalogue of scientific papers. This is exclusive of independent works on descriptive and economic botany, and of which his 'Fragmenta Phytographiæ Australiæ' covers about a dozen volumes. Almost from the date of his arrival in his adopted continent, he had entertained the ambition of producing a 'Flora Australiensis,' and when the several governments of the Australian Colonies appointed one of the most distinguished botanists in England, Mr. G. Benthan, F.R.S., to undertake the work, Mueller, at once recognizing the wisdom of the selection, and that an access to the Australian collections contained in European Herbaria was essential to the perfection of the work, generously offered the use of his own unrivalled Herbarim, notes, and observations, in aid of the undertaking. During the whole sixteen years occupied in the publication of this gigantic undertaking, which extended to seven volumes, Mueller was unceasing in his efforts to contribute to its success, working in unbroken harmony with its author throughout. Of his own numerous works three especially are of permanent value, the 'Eucalyptographia,' a history with excellent drawings of the Eucalypti of the continent; the 'Select Extratropical Plants eligible for Industrial Culture in Australia,' a work unique of its kind, and overflowing with valuable suggestions of a thoroughly practical nature; and his 'Introduction to Botanic Teaching in the schools of Victoria.'

Few men have received so many honours as the late baron. He was one of the first three in Australia to receive the Order of St. Michael and St. George; he was promoted to Knighthood in the Order in 1879. In 1871 he was made a hereditary baron by the King of Würtemberg. From Portugal and from Spain he received high orders. He was made a Fellow of the Royal Society in 1861, and in 1888 the society awarded him one of its Royal medals. He was a corresponding member of some 150 scientific societies. He had been a Fellow of the Royal Geographical Society since 1858.

Personally Baron von Mueller was a man of a warm heart and great kindliness of nature. Though a botanist by choice and profession, he was in other respects a man of great culture, interested in many branches of knowledge, and a lover of music, the practice of which art he zealously advocated amongst the young and old of the colony. He was a voluminous correspondent, ever ready to help his friends; somewhat vain, perhaps, but of a vanity that was never offensive. He has rendered services of a high order to Australia, in the history of the advancement of which his name will always be held in high honour.

Professor Josiah Dwight Whitney.

Professor Josiah Dwight Whitney, who died last August 24 at the age of seventy-seven, commenced the long series of geological labours which have made his name famous in 1840, when he was at work on the survey of New Hampshire. After spending two years of study in Europe, supplementary to his university training at Yale, he worked out the geology of the Lake Superior region in conjunction with Mr. J. W. Foster, the results being published in 1849, 1850, and 1851. These surveys involved a large amount of topographical mapping as a necessary preliminary to the geological delineation; and in most of his subsequent

work Mr. Whitney had occasion to lay the foundations by means of a pioneer geographical survey. In 1854, after several years' travelling in the west of the United States, he produced a work on the 'Metallic Wealth' of that country, including a comparison with the rest of the world. A similar volume, 'The Mineral Resources of the United States,' has since been made an official annual publication of the national geological survey, and is a document of the utmost value to students of economic geography. Mr. Whitney was engaged in succession on the geological surveys of Iowa, Wisconsin, Illinois, and California, devoting ten years' work to the scientific study of the last-named state. He was for a time Professor of Chemistry in Iowa University, and from 1865 until his death he has occupied the chair of geology at Harvard. It is impossible, in a brief note, to enumerate his published contributions to geological and geographical science. The name of Mount Whitney, the highest summit of the Rocky mountains in the United States, perpetuates his memory and records the esteem in which he was held by his contemporaries. Professor Whitney had been an Honorary Corresponding Member of the Royal Geographical Society for many years.

Dr. J. A. Moloney.

Dr. Moloney's death, at the early age of thirty-eight years, adds another name to the long list of victims to the hardships of African exploration, for to these must, no doubt, be attributed the aortic aneurism from which he suffered, and which ended fatally on October 5 last. Dr. Moloney was the son of the late Captain Moloney, of the 60th Rifles. He was born at Newry, in Ireland, and graduated at Dublin University, after previously studying medicine at St. Thomas' Hospital. His name first came into prominence as an African traveller through the part which he took in Captain Stairs' expedition to Katanga on behalf of the Congo Free State, which resulted in the extension of the state's authority over that part of the Congo basin. The death of Captain Bodson (the second in command) at Bunkeia, King Msidi's capital, and the dangerous illness of Captain Stairs, threw the task of bringing the expedition back to the coast on Dr. Moloney, who succeeded in so doing after countless difficulties and hardships. In 1893 he published an account of the expedition under the title 'With Captain Stairs to Katanga.' In 1895 Dr. Moloney was entrusted with a mission to the country west of Lake Nyasa, and succeeded in inducing several of the native chiefs to place themselves under British protection. He had been a Fellow of the Royal Geographical Society since 1892.

CORRESPONDENCE.

Makran.

Davos Platz, October, 1896.

If it will not be thought to be unduly prolonging the correspondence on this subject I should like to make a few remarks with reference to Colonel Holdich's letter in the *Journal* for the current month, and, in the first place, to express my regret for having misread him in the way he points out.

Colonel Holdich will, I dare say, be amused to learn that after putting Fahraj near Bampur "out of the question" I now find myself under the necessity of reinstating it as the starting point of Ibnu Khurdadhbeh's extremely puzzling route "from Fahraj to Sind." I am led to this by a further and more careful comparison of what is to be gathered on the point from the above-mentioned geographer with what is stated by Yakubi and Istakhri. After my previous and

unfairly long communication I cannot ask for the space that would be requisite if I were to state the grounds of my new conclusion, which must await some other time and some different channel of publication, but I shall be happy to submit them privately to Colonel Holdich if he would care to know them. He would, I feel sure, be satisfied with them.

To put the result summarily, Fahraj near Bampur is the place locally called *Fahra* in the middle ages. Then the *Basurjan* of Ibnu Khurdadhbeh, the *Masurjan* of Idrisi, and the *Masakan* of Istakhri, are one and the same place. This, in all probability, occupied the site of the present Sarbaz. It is stated to have been 24 farsakhs from Fahra, while Sarbaz (according to Sir F. Goldsmid's route) is 73 miles distant from that place. In Ibnu Khurdadhbeh's time it was the chief town of "the Schismatics" (for his *Medinetu 'l Kharun* read *Medinetu 'l Khuruj*), and these people, we know from the later Arab writers, were settled along the course of the Sarbaz river. Subsequently *Rask* became their capital. This place, lower down the river and 40 miles from Sarbaz, is not mentioned by Ibnu Khurdadhbeh, but I would identify it with his "village of *Yahya bin Amr*," 10 farsakhs from Basurjan (*Sarbaz*), and would suppose that Yahya was then the headman of the place, or that he was, perhaps, its founder. From Rask onwards to Panjgur, I must confess I can make nothing of the route, nor can I identify a single one of the ten intervening stations. According to the later Arab geographers, there was a route from Rask through the present Bampusht district to Dizak, and thence to Panjgur, the entire distance from the first place to the last being 6 stages, while modern itineraries and maps would make it about 230 miles. How, then, can we account for Ibnu Khurdadhbeh's 93 farsakhs, or say 336 miles—perhaps 370 miles? The route cannot have proceeded from Rask through the Kej valley, otherwise Kej, the capital and probably the most ancient place in the valley, would surely have appeared among the stations; but it does not, nor does any other place east or west of Kej shown in published maps. There I must leave the difficulty. Perhaps Colonel Holdich, with the far greater advantages he possesses, can solve it. Allowing it its full weight, it does not, in my opinion, counterbalance the evidence in favour of the identifications above stated, though in present circumstances I can only offer these for provisional acceptance.

M. R. Haig.

The Discovery of the very Important Lundai Sin, or Swat River.

October 12, 1896.

In the *Geographical Journal* for this present month there is a letter on the subject of "Makran," by Lieut.-Colonel Holdich, R.E., on which subject I have nothing to say at present; but, in the last paragraph of the letter, referring to the serious mistakes made with respect to that part of the Kafiristan, which has caused some trouble, and more discussion, he says, "We found that the river flowing through Kafiristan from the west into the Chitral or Kumar [*sic*] river, and correctly called Arnawai, . . . was also called 'Bashgol' and '*Lundai Sin*;'" and that he has "*discovered one other very important Lundai Sin, which is also called the Swat river.*"

It is to this last "discovery" I have more particularly to refer. Any small or minor river may be, and is, called Landaey Sin—not "Lundai"—by the Afghan people and others dwelling near them. *Land* is the Pushto adjective for "small," "little," "short," etc., and the diminutive form of that adjective is *landaey* for the masculine singular, *landa'í* for the feminine, and *landí* for the plural, both masculine and feminine. Sin, or Sind, a corruption of Sanskrit *sindhu*, means a

sea or river; consequently any small river would be called the Landaey Sin without that being the proper designation of such river.

As to the discovery that the "very important Lundai Sin is called the Swat river," it is a great mistake. The river of Panj-korah and the river of Suwat, or Suwad, having united, join the river of Kabul and its tributaries at Do-bandi, a little to the north of the village of Shaikh Isma'il, and is *then* known as the Landaey Sin, or Small or Little river, until north of Atak it unites with the Aba Sin, or Father River, or Father of Rivers, the name by which the Sindhu or Indus is known in those parts by the inhabitants generally. The Landaey Sin is also shown in the map of the "Mullah's Explorations" in 1876.

A person cannot stay long at Peshawar or in its district without soon knowing what Landaey Sin refers to; and in "An Account of the Province of Peshâwar" which I submitted to Government in 1851, for which I received the thanks of the Government of India, and which was subsequently published in the *Transactions of the Bombay Geographical Society* in 1852, I described the Landaey Sin. In my Pushto Dictionary, published in 1860, the Landaey Sin will be found described at pp. 636 and 877, in my "Account of Upper and Lower Suwât to the source of the Suwât river," in the *Journal of the Asiatic Society of Bengal* for 1862, and also in my 'Notes on Afghanistan,' etc., pp. 215 and 243, and other places; and by the name of Landaey Sin the united rivers have been known "from time immemorial."

H. G. Raverty, Major, Bombay Army (Retired).

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce, Commercial.
C. Rd. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
J. = Journal.
M. = Mitteilungen.
Mag. = Magazine.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue, Revista.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Austria—Alpine Provinces. *M.G. Ges. Wien.* **39** (1896): 529-540. **Richter.**

Ueber einen historischen Atlas der österreichischen Alpenländer. Von E. Richter.

On a projected historical atlas of the Austro-Hungarian monarchy, with suggestions for such a work dealing in detail with the alpine provinces. The paper is reprinted from a memorial volume to Prof. Franz von Krones of Graz, only fifty copies of which appeared.

Austria—Bosnia and Herzegovina. *Globus* **70** (1896): 165-170; 184-190. **Hoernes.**

Bosnien und die Hercegovina in Vergangenheit und Gegenwart. Von Dr. Moriz Hoernes. *With Illustrations.*

Austria-Hungary.

Monumenta Hungariae Juridico-Historica. Corpus Statutorum. Tomus iv. Pars Prima. Statuta et Articuli, Municipiorum Hungariae Cis-Danubianorum. Budapestini, 1896. Size 10 × 6½, pp. lxxxiv. and 916. *Presented by the Hungarian Academy of Sciences.*

Austria—Rainfall, etc.

Hydrographischer Dienst in Oesterreich. Jahrbuch des K. K. hydrographischen Central-Bureaus. II. Jahrgang 1894. Wien: W. Braumüller, 1896. Size 14½ × 10½, pp. xxvi. and 552. *Map and Diagrams. Presented by the K. K. Hydrographische Central-Bureau in Wien.*

Denmark. **Willaume-Jantzen.**

Meteorologiske Observationer i Kjøbenhavn bearbejdede af V. Willaume-Jantzen med et Résumé des Observations Météorologiques de Copenhague. Kjøbenhavn: G. E. C. Gad, 1896. Size 10½ × 8½, pp. 68 and xlviii.

Denmark—Bornholm. **Paulsen.**

Oversigt K. Danske Vidensk. Selsk. Forhand. (1896): 246–286.

Régime magnétique de l'île de Bornholm. Par Adam Paulsen. *With Maps.*

A very minute magnetic survey which led to some interesting results.

France—Aquitaine. *B.S.G. Com. Bordeaux* **19** (1896): 353–360, 385–396. **Dutrait.**

Topographie ancienne des étangs de Hourtin et de Lacanan et position probable du port d'Anchise. Par M. Dutrait.

Includes a sketch-map of the actual and the probable original outline of a section of the coast. See Monthly Record.

France—Chamonix. **Whymper.**

Chamonix and the range of Mont Blanc. A Guide by Edward Whymper. London: John Murray, 1896. Size 7½ × 5, pp. xiv. and 192. *Maps and Illustrations. Price* 3*s.* *Presented by the Author.*

Mr. Whymper's guide-book is, as might be expected, an original work of value to the student as well as to the mountaineer and the tourist. The historical chapters include what is practically a history of the origin of mountaineering, the first ascents of Balmat, Paccard, and de Saussure being described in detail. "A chapter of accidents" affords salutary warning to rash climbers, and an account of the observatories on the summit brings the scientific "record" of Mont Blanc up to date. The last seven chapters forming the guide-book proper describe the ways to Chamonix and the excursions to be made from it. Nine appendices supply statistical information as to peaks and passes, lists of guides and their tariffs, and tables for converting measures in feet and metres.

France—Garonne. *Ann. G.* **5** (1896): 368-385. **Lemoine.**

Essai sur l'hydrométrie du bassin de la Garonne. Par M. Georges Lemoine. *With Maps and Diagrams.*

France—Gascony. **Grandjean.**

B.S.G. Commerc. Bordeaux **19** (1896): 129, 170, 210, 238, 273, 289.

Les landes et les dunes de Gascogne. Par C. Grandjean.

France—Paris. **Baedeker.**

Paris and Environs, with Routes from London to Paris. Handbook for Travellers by Karl Baedeker. With 12 Maps and 33 Plans. Twelfth Revised Edition. Leipsic: Karl Baedeker, 1896. Size 6½ × 4½, pp. xlvi., 418, and 34. *Price* 6 *marks. Presented by Messrs. Dulau & Co.*

German Marine Observatory. *Ann. Hydrographie* **24** (1896): 252–258. **Neumayer.**

Ueber die Thätigkeit der Deutschen Seewarte. Vortrag des Direktors der Deutschen Seewarte, Wirklicher Geheimer Admiralitätsrath Prof. Dr. Neumayer.

Germany and Austria. **Joanne.**

Collection des Guides-Joanne. Allemagne Méridionale et Autriche-Hongrie. Paris: Hachette et Cie., 1896. Size 6¾ × 4½, pp. xxxvi., 524, and 94. *Maps and Plans.*

Germany—Bavaria. **Orff.**

Abh. Math.-Phys. Classe K., B.A. Wiss. München **18** (1895): 459–589.

Telegraphische Längenbestimmungen für die Königliche Sternwarte zu Bogenhausen. II. Theil. Von Carl von Orff.

The calculations are given in full, fixing Bogenhausen as 18m. 55·123s. west of Vienna; 9m. 40·125s. east of Milan; 15m. 21·422s. east of Strasburg; 46m. 26·226s. east of Greenwich; and 7m. 8·793s. east of Berlin.

Germany—Moors. *Globus* **70** (1896): 73–78. **Krause.**

Die Existenzbedingungen der nordwestdeutschen Heidefelder. Von Dr. med. Ernst H. L. Krause. II.

Germany—Prussia. *Petermanns M.* **42** (1896): 173–187. **Helbfass.**

Der Arendsee in der Altmark. Von Dr. Wilh. Halbfass. *With Map.*

Germany—Prussia. *Globus* **70** (1896): 229–236, 281–285. **Tetzner.**

Die Kaschuben am Lebasee. Von Dr. F. Tetzner. *With Map and Illustrations.*

Germany—Saxony. ———

Kalender und Statistisches Jahrbuch für das Königreich Sachsen nebst Marktverzeichnissen für Sachsen und die Nachbarstaaten auf das Jahr 1897. Dresden: C. Heinrich, 1896. Size 8 × 5½, pp. 90, viii., and 250.

Germany—Schleswig-Holstein. **Schück.**

Magnetische Beobachtungen auf den West-Inseln und einigen Punkten der Westund Südküste Schleswig-Holsteins, übertragen auf 1895, von Kapitain A. Schück, Hamburg. Schriften des Naturwissenchaftlichen Vereins für Schleswig-Holstein. Band xi., Heft 1, 1896. Pp. 36-38. Size 9½ × 6½. *Presented by the Author.*

Germany—Sunshine. *Ann. Hydrographie* **24** (1896): 313–325. **König.**

Dauer des Sonnenscheins im deutschen Küstengebiete. Von Helmuth König.

Italy—Lake Maggiore. *Le Globe, Mém. S.G. Genève* **35** (1896): 47–54. **Ritter.**

Morphométrie du lac Majeur, suivie d'une note sur les Tables de glacier en glace. Par Étienne Ritter. *With Plate.*

Netherlands—Bibliography. **Nijhoff.**

Bibliotheca Historico-Geographica Neerlandica. Catalogue de Livres, Anciens et Modernes, Cartes, Plans, etc., concernant l'histoire locale et la topographie des Pays-Bas. En vente aux prix marqués chez Martimes Nijhoff à la Haye, Nobelstraal 18, 1896. Size 9 × 6, pp. 50, 144, and 168.

Norway. *Rev. Scientifique* (4) **6** (1896): 399–401. **Antoniadi.**

Voyage en Laponie. Par M. Antoniadi.

Norway. *B.S. Normande G.* **17**, 1895 (1896): 351–369. **Le Roux.**

Voyage à travers la Norvège. Par M. Hughes Le Roux.

Rhine. **Baedeker.**

The Rhine from Rotterdam to Constance. Handbook for Travellers by Karl Baedeker. With 44 Maps and 24 Plans. Thirteenth Revised Edition. Leipsic: Karl Baedeker, 1896. Size 6½ × 4½, pp. xxxiv. and 422. *Price 7 marks. Presented by Messrs. Dulau & Co.*

For a new edition of a guide-book to contain no reference to touring cyclists and their requirements, is an omission which Mr. Baedeker might find it to his advantage to fill.

Russia—Novorossisk. *B.S.G. Commerc. Havre* **13** (1896): 70–92. **Fauvel.**

Le nouveau port russe de Novorossisk. Par A. A. Fauvel.

Spitzbergen. *Nature* **54** (1896): 437–438. **Gregory.**

The Conway Expedition to Spitzbergen. By Dr. J. W. Gregory.

Sweden—Water-Temperature. **Hamberg.**

Bihang K. Svensk. Vetenskaps- A. Handlingar **21** (1896): 26.

Temperaturobservationer i Mälaren och Saltsjön vid Stockholm. Af Axel Hamberg. *With Plate.*

Switzerland. **Messerschmitt.**

Relative Schweremessungen in der Schweiz. Von Johann Baptist Messerschmitt. Festschrift der Naturforschenden Gesellschaft in Zürich, 1746–1896. II. pp. 92–99. Zürich: Zürcher & Furrer, 1896. Size 9½ × 6½.

Switzerland. ———

Régime des eaux en Suisse. Bassin du Rhin depuis ses sources jusqu'à l'embouchure de la Tamina. Première partie. Surfaces des Bassins de réception, des zones de 300 en 300 m. au-dessus de la mer, des rochers, des forêts, des glaciers et des lacs. Deuxième partie. Stations limnimétriques au point de vue de leur emplacement et de leur repèrage avec profils en travers pour chaque station et pentes relatives de l'eau à la surface. Travail exécuté par la Section hydrométrique de l'Inspectorat fédéral des travaux publics, 1895. Size 15½ × 10½, pp. 56 and 8. *Map and Plates. Presented by Professor Paul Chaix.*

United Kingdom—England. **Norris.**

Catalogue of the Huntingdonshire Books collected by Herbert E. Norris. Written with Notes by Himself. Cirencester, for Private Circulation, 1895. Size 8 × 5½, pp. 52. *Presented by the Author.*

This bibliography of Huntingdonshire comprises about five hundred entries dating from 1610 to 1895, relating to the county and to the constituent parishes. The references are not only to books, maps, or other publications referring to the locality, but include works written by natives or residents of the county.

United Kingdom—England. **Ward.**

Thorough Guide Series. North Devon [including West Somerset] and North Cornwall from Exmoor to the Scilly Isles, with a description of the various approaches. By C. S. Ward. Twenty Maps and Plans by J. Bartholomew. Seventh Edition. Revised. London: Dulau & Co., 1896. Size 6½ × 4½, pp. xvi. and 160. *Price 3s. 6d. Presented by the Publisher.*

Excellent maps on the scale of half an inch to a mile are included.

United Kingdom—Geological Survey. ———

List F. Memoirs, Maps, etc., issued by the Geological Survey of the United Kingdom and the Museum of Practical Geology. Size 10½ × 7½, pp. 68. *Index Maps. Presented by the Director-General of the Geological Survey.*

United Kingdom—Ireland—Donegal. *Blackwood's Mag.* **160** (1896): 467–480. ———

In Dark Donegal: The Tourist on the Celtic Fringe.

ASIA.

Central Asia—Bokhara. *Globus* **70** (1896): 138–142. **Vambéry.**

Bilder aus Bochara. Von H. Vambéry. *With Illustrations.*

Dutch East Indies. *Petermanns M.* **42** (1896): 187–192. **Zondervan.**

Die Entwickelung der Kartographie von Niederländisch-Ostindien. Von H. Zondervan.

Formosa. *Kew B.* (1896): 65–76. ———

Botany of Formosa.

India—Bengal. **Sunder.**

Final Report on the Land Revenue Settlement of the Western Duars, Bengal. By D. H. E. Sunder. Calcutta: Bengal Secretarial Press, 1895. Size 12½ × 8, pp. xiv., 164, and xxvi. *Index Map. Presented by the Author.*

India—Economic Products. **Watt.**

A Dictionary of the Economic Products of India. By George Watt (assisted by numerous contributors). Index. Prepared by Edgar Thurston. Calcutta, 1896. Size 10 × 6½, pp. 166. *Presented by the Government of India.*

This very useful index to a most valuable work could have been made much more convenient for reference by adopting bolder type for the leading words, and by repeating at the head of each column the word to which the entries apply.

India—Madras. *Miss. Catholiques* **28** (1896): 285–287, 296–298. **Bonaventure.**

Dans les forêts Khondes de Ganjam. Par le R. P. Bonaventure.

India—Madras. **Thurston.**

Madras Government Museum. Bulletin No. 4. Anthropology of the Todas and Kotas of the Nilgiri Hills; and of the Brâhmans, Kammâlans, Pallis, and Pariahs of Madras City. By Edgar Thurston. Madras, 1896. Size 9 × 5½, pp. [96]. *Illustrations.*

Indo-China. *Ann. G.* **5** (1896): 429–436. **Roux.**

Note sur les longitudes et altitudes observées et calculées par M. E. Roux (Expédition du prince Henri d'Orléans, de MM. Roux et Briffaut, du Tonkin aux Indes, 1895).

Persia. *B.S. Normande G.* **18** (1896): 1–28. **Dieulafoy.**

A travers la Perse (conférence). Par Mme. Dieulafoy. *With Portrait.*

Siberia. **Schrenck.**

Reisen und Forschungen im Amur-Lande in den Jahren 1854–1856 im Auftrage der Kaiserl. Akademie der Wissenschaften zu St. Petersburg, ausgeführt und in Verbindung mit mehreren Gelehrten herausgegeben von Dr. Leopold v. Schrenck. Band iii. Dritte Lieferung. Die Völker des Amur-Landes. Ethnographischer Theil. Zweite Hälfte. St. Petersburg, 1895. Size 13½ × 9½, pp. xvi. and [144]. *Plates.*

The bear-feasts and funeral ceremonials of the Amur Gilyaks are described and illustrated, the proceedings being similar to those of the Ainu.

Southern Asia. **Lapicque.**

Tour du Monde, **1** (*n.s.*) (1895): 409, 421, 433, 445, 589, 601, 613; **2** (*n.s.*) (1896): 37, 49, 61, 73.

A la Recherche des Négritos (voyage du yacht *Sémiramis*). Première Partie: Les Andaman; Deuxième Partie: Les îles Mergoui; Troisième Partie: La Péninsule Malaise; Quatrième Partie: La Sonde Orientale. *With Maps and Illustrations.*

Tibet. *S.G. Paris, C.R.* (1896): 234-241; 250-252. **Bonin.**

Voyage de M. Bonin. [De Tali à Tatsienlou à travers le Tibet.]
Sur le voyage de Bonin. *With Map.*

AFRICA.

Abyssinia. *B.S.G. Paris* (7) **17** (1896): 212–232. **Caillaud.**

Les tentatives des Franciscains au moyen age pour pénétrer dans la Haute-Éthiopie. Par F. Romanet du Caillaud.

Africa. **Leo Africanus.**

The History and Description of Africa and of the notable things therein contained, written by Al-Hassan Ibn-Mahommed Al-Wezaz Al-Fasi, a Moor, baptised as Giovanni Leone, but better known as Leo Africanus. Done into English in the year 1600 by John Pory, and now edited, with an Introduction and Notes, by Dr. Robert Brown. 3 vols. London: Printed for the Hakluyt Society, 1896. Size 9 × 6, pp. viii., cxii., and 1120. *Maps. Presented by the Hakluyt Society.*

The death of Dr. Robert Brown left his work on these volumes unfinished, but so near completion that it was judged advisable to issue it without further addition. The sheets were revised in passing through the press by Dr. E. Denison Ross, and a valuable series of maps with notes, which are the result of his independent study, was contributed by Mr. Ravenstein. The main body of the work is an exact reprint of Pory's translation, the editor's care having been devoted to a biographical and critical introduction and to explanatory notes.

Algeria. *B.S.G. Paris* (7) **17** (1896): 145–153. **Vuillot.**

Note sur un voyage de Nefta à Ghadamès (mars-avril 1893) exécuté par MM. Cazemajou, capitaine du génie, et Dumas, lieutenant au 4e spahis. Par Paul Vuillot. *With Map and Illustrations.*

Algeria and Tunis. *B.S.G. d'Alger.* **1** (1896): 32–34. **Périé.**

Projet de Carte de l'Algérie et de la Tunisie. Par M. A. Périé.

Algeria and Tunis. *P. American Philosoph. S.* **35** (1896): 39–56. **Pepper.**

Eucalyptus in Algeria and Tunisia, from an hygienic and climatological point of view. By Dr. Edward Pepper.

British Central Africa. **Johnston.**

Africa, No. 5 (1896). Report by Commissioner Sir Harry Johnston, K.C.B., on the Trade and General Condition of the British Central Africa Protectorate. April 1, 1895, to March 31, 1896. London: Eyre & Spottiswoode, 1896. Size 13½ × 8½, pp. 28. *Map. Price 9d.*

Central Africa. *B.S.G. d'Alger* **1** (1896): 24–31. **Rivière.**

Les Bambous aux Grands Lacs de l'Afrique Centrale. Par M. Ch. Rivière.

Congo. *Missions en Chine et au Congo* (1896): 294-299. **Cambier.**
Congo: Lettre du P. Cambier: les troubles de Luluabourg.

Congo State—Coffee. *Mouvement G.* **13** (1896): 276-278. **Laurent.**
La Culture du Caféier au Congo. Par Em. Laurent.

East Africa. *B.S.G. Italiana* (3) **9** (1896): 272-273. **Millosevich.**
Seconda spedizione Bottego: Coordinate astronomiche di alcuni punti. Del prof. E. Millosevich.

East Africa—Somaliland. *Mem. S.G. Italiana* **6** (1896): 149-170. **Bòttego.**
La seconda spedizione Bòttego nella Somalia Australe. *With Maps and Illustrations.*
This will be referred to in the Monthly Record.

Egypt—Red Sea Coast. *Nineteenth Century* **40** (1896): 580-595. **Bent.**
On the Dervish Frontier. By J. Theodore Bent.

French Congo. *B.S.G. Paris* (7) **17** (1896): 154-187. **Barrat.**
Ogôoué et Como (Congo Français). Par Maurice Barrat. *With Map.*

French Congo. *B.S.G. Paris* (7) **17** (1896): 188-211. **Cholet.**
La Haute Sangha (Congo Français). Par Ed. Cholet.

French Congo. *B.S. Normande G.* **17**, 1895 (1896): 329-350. **Decazes.**
Le Haut-Oubangui. Par M. le Commandant E. Decazes. *With Map.*

French West Africa. *La Géographie* **9** (1896): 465-467. **Béhagle.**
Voyage Commercial au Bassin du Tchad (Afrique Centrale). Par Ferdinand de Béhagle.

French West Africa. *La Géographie* **9** (1896): 459-461. **Paroisse.**
Contribution à l'Étude du Climat de la Guinée Française. Par Georges Paroisse.

German East Africa—Mafia. **Baumann.**
Wissenschaftliche Veröffentlichungen des Vereins für Erdkunde zu Leipzig. Dritter Band, Erstes Heft. Die Insel Mafia. Von Dr. Oskar Baumann. Leipzig: Duncker and Humblot, 1896. Size 10 × 6½, pp. 38. *Map.*

German South-West Africa. *Globus* **70** (1896): 79-80. **Brincker.**
Bemerkungen zu Bernsmanns Karte des Ovambolandes. Von P. H. Brincker. Stellenbosch. *With Map.*

German West Africa—Togo. **Plehn, Gruner, Baumann, and Sprigade.**
M. Deutsch. Schutzgeb. **9** (1896): 117-147.
Bericht über den Verlauf meiner Reise nach Atakpame, Akposso und Kebu. Vom 4 März bis zum 17 April, 1896. Von Lieutenant R. Plehn.
Siedepunktbestimmungen. Von Dr. Gruner und E. Baumann in Togo.
Begleitworte zu der Karte des südlichen Theiles von Togo. Von P. Sprigade. *With Map.*

Madagascar. **Grandidier.**
Congrès des Sociétés Savantes. Discours [sur Madagascar] prononcé à la Séance Générale du Congrès le samedi 11 Avril 1896. Par M. Grandidier. Paris: Imp. Nationale, 1896. Size 11½ × 7½, pp. 16. *Presented by the Author.*

Madagascar. *Rev. Scientifique* (4) 6 (1896): 75-81. **Vincent and Burot.**
Le paludisme à Madagascar. Par MM. Vincent et Burot.
On malaria in Madagascar.

Madagascar—Sainte-Marie. *Rev. Maritime* **130** (1896): 419-445. **Landrieu.**
A Madagascar. L'île de Sainte-Marie. Par M. G. Landrieu.

A careful account of the island from personal knowledge and the study of local archives. The description deals with the island, inhabitants, productions, trade, and in his concluding remarks the author warns emigrants of the small farmer class from attempting to settle in a place where only native labour is possible.

North Africa. *B.S.G. d'Alger.* **1** (1896): 39-45. **Jenoudet.**
Monographie de la Tribu des Righas. Par M. Jenoudet.

South Africa. **Gill.**
Cape of Good Hope. Report on the Geodetic Survey of South Africa executed by Lieutenant-Colonel Morris, R.E., etc., in the years 1883-92, under the direction of David Gill, Her Majesty's Astronomer at the Cape, together with a Rediscussion

of the Survey executed by Sir Thomas Maclear, F.R.S., in the years 1841–48, by David Gill. Cape Town: W. A. Richards & Sons, 1896. Size 13 × 8½, pp. xiv., 174, and 292. *Maps, Plates, and Diagrams.*

This is a report of the utmost scientific value, presenting the full record of the great geodetic survey of South Africa, which forms the basis of all future cartography in that region. Dr. Gill's paper on the subject printed in the *Report* of the Sixth International Geographical Congress presents in brief the results which are here set forth at length.

Sudan Almanac.

Sudan Almanac, 1896. Compiled at the Intelligence Division, War Office. Size, 6 × 4, pp. 18.

Transvaal.

Transvaal, die Südafrikanische Republik. I. Geschichtliche und wirthschaftliche Entwickelung. Eine Studie von — R. Berlin: Commissions-Verlag von Kühling & Güttner, [no date]. Size 8½ × 6, pp. 30.

Transvaal. **Aburrow.**

Report of work done and general information relating to the Public Works Department of the Johannesburg Gezondheids Comite, S.A.R., for year ending December 31, 1895. By Chas. Aburrow. Johannesburg, 1896. Size 13 × 8, pp. 22 and 8. *Presented by the Author.*

Tripoli. *Mem S.G. Italiana* **6** (1896): 103–140. **Bricchetti-Robecchi.**

Il commercio di Tripoli, relazione del socio d'onore cav. ing. L. Bricchetti-Robecchi.

Tripoli—Cyrenaica. *Globus* **70** (1896): 236–240. **Grothe.**

Ein Besuch in Bengasi (Cyrenaïka). Von Hugo Grothe.

Tunis. *Ann. G.* **5** (1896): 386–406. **Larminat.**

Étude sur les formes du terrain dans le Sud de la Tunisie (Frontière de la Tripolitaine). Par le captitaine E. de Larminat. *With Map and Illustrations.*

West Africa—Borgu. *B. Comité l'Afrique Française* **6** (1896): 258–263. **Deville.**

Dans le Borgou: Le Royaume de Bouay. Par M. A. Deville. *With Map.*

West Africa—Fernando Po. *B.S.G. Madrid* **38** (1896): 49–56. **Bonelli.**

Exploraciones en Fernando Póo. Por D. Emilio Bonelli. *With Illustrations.*

Recent explorations by missionaries are referred to.

NORTH AMERICA.

Canada—Hudson Bay. *American J. Science* (4) **2** (1896): 200–205. **Tyrrell.**

Is the land around Hudson Bay at present rising? By J. Burr Tyrrell, of the Geological Survey of Canada.

Mexico. *P.I. Civil Engineers* **125** (1896): 243–281. **Corthell.**

The Tampico Harbour Works, Mexico. By E. L. Corthell, D.Sc., etc. *With Plate and Illustrations.*

Includes the record of automatic tide-gauges on the Gulf of Mexico.

United States—Bureau of Ethnology. **Powell.**

Thirteenth Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution, 1891–92. By J. W. Powell, Director. Washington, 1896. Size 12 × 8, pp. lx. and 462. *Illustrations.*

In addition to the official report, this volume contains papers on prehistoric textile art of Eastern United States, by W. H. Holmes; on stone art, by Gerard Fowke; on aboriginal remains and native dwellings in Arizona and Omaha, by various writers; and a remarkable translation of Zuni creation myths, by F. H. Cushing, showing the primitive ideas of the wanderings of the human race largely actuated by the search for the middle of the Earth.

United States—California. **Perrine.**

Earthquakes in California in 1894. By Charles D. Perrine.—Bulletin of the United States Geological Survey. No. 129. Washington, 1895. Size, 9½ × 6, pp. 26. *Presented by the U.S. Geological Survey.*

United States—California—San Francisco Peninsula. **Lawson.**

Sketch of the Geology of the San Francisco Peninsula. By Andrew C. Lawson.—Fifteenth Annual Report of the United States Geological Survey to the Secretary

of the Interior, 1893–94. By J. W. Powell, Director. Pp. 405–476. Washington, 1895. Size 12 × 8. *Map and Illustrations.*

The maps include some fine reproductions of relief models of the site of San Francisco.

United States—Census. ——

[Eleventh Census of the United States, 1890.] Report on Manufacturing Industries in the United States. Part i. Totals for States and Industries (pp. 1002). Part ii. Statistics of Cities (pp. xliv. and 828); Report on Real Estate Mortgages. Washington, 1895. Size 12 × 9½, pp. viii. and 944. *Diagrams.*

GENERAL.

Aërial Navigation. *Scottish G. Mag.* **12** (1896): 290-298. **White.**

Aërial Navigation. By A. Silva White.

Bibliography. ——

Catalogue of the Library of the India Office. Vol. i. Supplement. London: Printed by Eyre & Spottiswoode, 1895. Size 9 × 6, pp. 384. *Presented by the Secretary of State for India.*

Bibliography. ——

Ministère de la Guerre. Bibliothèque du Dépôt de la Guerre. Catalogue. Tome Huitième. (Supplément i.) Paris: Imp. Nationale, 1893. Size 10 × 6½, pp. ii. and 530. *Presented by the French Minister of War.*

The supplement contains the titles of works exclusively relating to military science, including military geography.

Bibliography. **Campbell.**

The Literature of Geography: how shall it be recorded? By Frank Campbell. Reprinted from the 'Report of the Sixth International Geographical Congress, London, 1895' (pp. 391–398). Size 10 × 6½, pp. 8.

Bibliography. ——

Geographical Index (Extra-European) to Books, Periodicals, etc., 1895. Map Room, Intelligence Division, W.O., 31st December, 1895. Size 11 × 7½, pp. xviii. and 86. *Presented by the Intelligence Division, War Office.*

This geographical index to books is now being published monthly.

Bibliography—Spanish. ——

Librería de Penella y Bosch . . . Barcelona. Catálogo de las Obras de fondo y surtido clasificadas por Materias y seguidas de un Indice alfabético de Autores y Traductores. Barcelona: Penella y Bosch, 1896. Size 8½ × 6½, pp. viii. and 228.

A priced catalogue of Spanish works.

British Colonies. **Gill.**

The British Colonies, Dependencies, and Protectorates, Physical, Commercial, Descriptive, Political, Social, Historical. By George Gill. London: G. Gill & Sons, [1896.] Size 7½ × 5½, pp. 472. *Maps. Price 2s. 6d. Presented by the Publishers.*

A fairly careful compilation. The maps printed in colour, if somewhat rough, are effective. The spelling on maps and in text differs in many cases; and the deviations from the R.G.S. rules for place-name orthography, which the author says he follows "as far as usage renders it desirable," naturally do not commend themselves to those who strive after uniformity.

British Empire. *Nineteenth Century* (1896): 27–33. **Young.**

Commercial Union of the Empire. By Sir Frederick Young, K.C.M.G.

Cartography. *XIV. Jahresb. G. Ges. Bern*, 1895 (1896): 169–174. **Brückner.**

Die Frage der Weltkarte im Massstab 1: 1,000,000 vor dem Londoner Geographenkongress. Bericht . . . von Herrn Prof. Dr. Ed. Brückner.

Church Missionary Society. ——

Proceedings of the Church Missionary Society for Africa and the East. Ninety-seventh year, 1895–96. London: Church Missionary House, 1896. Size 8½ × 6, pp. lxxiv., 432, and (366). *Maps. Presented by the Church Missionary Society.*

Colonization.

Bibliothèque Coloniale Internationale. 1re Série. La main-d'œuvre aux Colonies. Documents officials sur le contrat de travail et le louage d'ouvrage aux Colonies. Tome i. Paris: A. Colin et Cie., 1895. Size 9½ × 6½, pp. vi. and 570. *Price* 20 *fr.*

Colonization.

Institut Colonial International. Compte rendu de la Session tenue à la Haye les 9, 10, 11, et 12 Septembre 1895. Paris: A. Colin et Cie., 1895. Size 9½ × 6½, pp. 428.

Education. **Dubois.**

Les Colonies et l'Enseignement Géographique. Conférence faite sous le patronage de l'Union Coloniale Française. Par M. Marcel Dubois. Paris: L. Chailley, 1896. Size 8½ × 5½, pp. 32.

A plea for fuller instruction in Geography as an incentive to colonial enterprise.

Education. **Herbertson.**

On the Importance of Geography in Secondary Education and the Training of Teachers therein. By Andrew J. Herbertson. Reprinted from the 'Report of the Sixth International Geographical Congress, held in London, 1895' (Congress Report, pp. 83–87). Size 10 × 6½, pp. 6.

Education. **Lehmann.**

Die Vorbildung der Geographielehrer auf den Universitäten Von Dr. Richard Lehmann. Separatabdruck aus dem Berichte des Sechsten Internationalen Geographenkongresses. London, 1895. [Congress Report, p. 72.] Size 10 × 6½, pp. 12.

A reprint of Dr. Lehmann's paper on the University education of teachers of geography.

Education. *B. Union G. Nord de la France* **18** (1895): 97–135. **Lejeal.**

La Géographie dans l'Enseignement primaire: Conférences faites devant les instituteurs de l'arrondissement de Boulogne-sur-Mer. Par M. Lejeal.

Education. **Levasseur.**

La Géographie dans les Écoles et à l'Université. Par E. Levasseur. Extrait des Comptes-rendus du Sixième Congrès International de Géographie tenu à Londres en Juillet, 1895. [Congress Report, pp. 27–70.] Size 10 × 6½, pp. 46.

This comprehensive paper gives the fullest description of the official French system of geographical education with specimens of the syllabus for different school-courses.

Educational—Text-book. **Wethey.**

A New Manual of Geography for Middle and Higher Forms in Schools. With a Preface on the Oral Method in teaching Geography. By E. R. Wethey. Vol. iv. Europe. London: Rivington, Percival & Co., 1896. Size 7½ × 6, pp. xii. and 314. *Maps and Plans. Price* 2*s.* 6*d. Presented by the Publishers.*

This is a new manual very carefully compiled, and containing a vast amount of information which is brought together with a surprisingly small number of mistakes. The plan resembles the old type of school-geography, being almost entirely tabular, and every artifice of variety of print and arrangement is employed to give full and clear expression to the grouping of facts. How far this improvement of the old style is preferable to the popular method of continuous narrative must be left for practical teachers to decide.

French Colonies. *B.S.G. Commerc., Paris* **18** (1896): 329–347. **Henry of Orleans.**

Madagascar, Indo-Chine Française, Yunnan, Assam. Notes commerciales et coloniales. Par le Prince Henri d'Orléans. *With Map.*

French Colonies. **Roux.**

Comment rendre nos Colonies prospères. Conférence faite sous le patronage de l'Union Coloniale Française. Par M. J. Charles-Roux. Paris: L. Chailley, 1896. Size 9 × 6, pp. 56.

Geneva Geographical Society. *Le Globe, Mém. S.G. Genève* **35** (1896): 1–46. **Claparède.**

Coup d'œil sur la Société de Géographie de Genève depuis sa fondation (1858–1896). Par M. Arthur de Claparède, Président.

Geographical Congress. *XIV. Jahresb. G. Ges. Bern* (1895): 3–26. **Brückner.**

Rapports du Comité du Ve Congrès international des sciences géographiques et des commissions spéciales sur l'exécution des résolutions votées à Berne en 1891. Rédigés par M. Ed. Brückner.

Geographical Papers. **Venukoff.**

M. Venukoff. Études géographiques. Paris: A. Reiff, 1896. Size 7 × 5, pp. 168. *Presented by the Author.*

A collection of papers reprinted from various French journals, dealing with various geographical questions, chiefly relating to Central-Asian explorations.

Geographical Progress. *B.S.G. Paris* (7) **16** (1895): 405–515. **Maunoir.**

Rapport sur les Travaux de la Société de Géographie et sur les Progrès des Sciences géographiques pendant l'année 1894. Par Ch. Maunoir.

Geographical Speculation. **Le Plongeon.**

Queen Móo and the Egyptian Sphinx. By Augustus Le Plongeon, M.D. London: Paul & Co., 1896. Size 10 × 7, pp. lxvi. and 278. *Portraits and Illustrations.*

This curious work argues that the Maya civilization was the most ancient, and gave origin to the civilizations of Egypt and Eastern Asia, professes to find documentary evidence of the former existence and disappearance of the mythical Atlantis, and even reproduces an ancient South-American sculpture which is held to contain a representation of the map of the western continent as known to modern cartographers.

Geographical Year-book. ——

Jahresbericht des Frankfurter Vereins für Geographie und Statistik. Siebenundfünfzigster bis neunundfünfzigster Jahrgang, 1892-93 bis 1894–95. Im Namen des Vorstandes herausgegeben von Dr. Friedrich Clemens Ebrard. Frankfurt am Main, 1896. Size 10 × 6½, pp. 152.

Geography. **Markham.**

Address to the Royal Geographical Society. By Sir Clements Markham, K.C.B., F.R.S., President. From the *Geographical Journal* for July, 1896. Size 10 × 6½, pp. 16.

Geography. *B. American G. S.* **28** (1896): 146–156. **Dodge.**

Geography from Nature. By Richard E. Dodge.

Suggestions as to home geographical studies in the neighbourhood of New York city.

Geography. *XIV. Jahresb. G. Ges. Bern* (1895): 73–86. **Poinsard.**

Curiosités géographiques. Comment la Géographie explique les phénomènes sociaux. Par M. Léon Poinsard.

Geography as a Science. **Batalha-Reis.**

On the definition of Geography as a Science, and on the conception and description of the Earth as an organism. By J. Batalha-Reis. Reprinted from the 'Report of the Sixth International Geographical Congress, held in London, 1895.' Size 10 × 6½, pp. 14.

German and Austrian Alpine Club. **Emmer.**

Register zu den Vereinsschriften des Deutschen und Oesterreichischen Alpenvereins einschliesslich jener des Oesterreichischen Alpenvereins und des Deutschen Alpenvereins. 1863–1894. Von Johannes Emmer. Graz, 1896. Size 9 × 6, pp. 166.

A valuable index to the publications of the German and Austrian Alpine Club.

German Colonies. **Meinecke.**

Koloniales Jahrbuch. Beiträge und Mittheilungen aus dem Gebiete der Kolonialwissenschaft und Kolonialpraxis. Herausgegeben von Gustav Meinecke. Achter Jahrgang. Das Jahr 1895. Berlin: Carl Heymanns Verlag, 1896. Size 9½ × 6½, pp. 318. *Portrait.*

German Colonies. *M. Deutsch. Schutzgeb.* **9** (1896): 49–52. ——

Geographische Positionen einiger Punkte in Deutsch-Ostafrika, in Kamerun, auf den Marshall-Inseln, sowie im Schutzgebiete der Neu-Guinea-Kompagnie nach den Angaben der Nautischen Abtheilung des Reichs-Marine-Amts.

German Colonies. *M. Deutsch. Schutzgeb.* **9** (1896): 115–116. ——

Geographische Positionen einiger Punkte in Kamerun und im Schutzgebiete der Neu-Guinea-Kompagnie nach den Angaben der Nautischen Abtheilung des Reichs-Marine-Amts.

Lady Travellers. *Blackwood's Mag.* (1896): 49–66. ——

Lady Travellers.

An inadequate account of some travellers who happened to be women. Those noticed are Ida Pfeiffer, Alexandrine Tinne, Lady Baker, Mrs. Bishop, Miss Gordon

Cumming, Miss Helen Peel, Miss Annie R. Taylor, and Miss Kingsley. The principle of selection, if any, is difficult to find. So many ladies have made yachting tours, accompanied their husbands on excursions, and gone out as missionaries, that it is perhaps inevitable that some should be omitted.

Languages.

Thimm's Self-Taught Library. French (pp. 80, *price* 1*s.* 6*d.*); Spanish (pp. 80, *price* 1*s.* 6*d.*); German (pp. 80, *price* 1*s.* 6*d.*); Norwegian (pp. 80, *price* 2*s.* 6*d.*); Italian (pp. 80, *price* 1*s.* 6*d.*); Turkish (pp. viii. and 136, *price* 2*s.* 6*d.*); Arabic (pp. viii. and 94, *price* 2*s.* 6*d.*). London: E. Marlborough & Co. Size 7½ × 5. *Presented by the Publishers at the request of Captain C. A. Thimm.*

Lisbon Geographical Society.

Société de Géographie de Lisbonne. Annexe au Bulletin No. 10. Statuts adoptés par l'Assemblée Générale le 3 Juin et approuvés par l'Autorité Publique le 3 Juillet 1895. (Traduction.) Lisbonne, 1895. Size 10 × 6½, pp. 46.

Local Geography. *Aus allen Welttheilen* **27** (1896): 321–326. **Fitzner.**

Die Bildung von Abteilungen für Heimatskunde. Von Rudolf Fitzner.

Maps for Education. *J. Geology* **4** (1896): 484–513. **Davis.**

Large-Scale Maps as Geographical Illustrations. By W. M. Davis.

Gives lists of sheets of the official survey-maps of European countries which Professor Davis has found of value in teaching the types of geographical forms in his practical classes at Harvard.

Missionary Explorations. *B.S.G. Lyon* **13** (1896): 541–570. **Groffier.**

Explorations et travaux géographiques des missionnaires catholiques en 1894 et en 1895. Par V. Groffier.

Missionary Reports.

Free Church of Scotland. Missionary Reports (Foreign), May, 1896. I. Foreign Missions (including Report of Woman's Society). II. Colonial Missions. III. Continental Missions. IV. Missions to the Jews. Edinburgh, 1896. Size 9 × 6, pp. 114, 74, 26, 18, 32.

Mountaineering. *P.R.I.* **14** (1896): 451–459. **Dent.**

Influence of Science on Mountaineering. By Clinton T. Dent.

Ordnance Maps.

Committee on Sale of Ordnance Survey Maps. Report of the Departmental Committee appointed by the Board of Agriculture to consider the arrangements to be made for the Sale of Ordnance Survey Maps, with copy of the Minute appointing the Committee. Also Minutes of Evidence . . . with Appendices and Index. [2 Reports.] London: Eyre & Spottiswoode, 1896. Size 13 × 8½, pp. 10 and 90. *Price* 1½*d. and* 9*d.*

Phrase-book. **Thimm.**

English, French, Turkish, and Russian Vocabulary and Dialogues, for practical use by the Army and Navy, Travellers, Sportsmen, Cyclists, and others in the East. By C. A. Thimm. London: E. Marlborough & Co. Size 6½ × 4½, pp. [74]. *Presented by the Publishers at the request of Captain C. A. Thimm.*

Place-Names. **Burgess.**

Geographical Place-Names in Europe and the East. By Jas. Burgess, C.I.E., etc. Reprinted from the 'Report of the Sixth International Geographical Congress, held in London, 1895.' Size 10 × 6½, pp. 12.

Place-Names. *National G. Mag.* **7** (1896): 221–227. **Gannett.**

The Work of the United States Board on Geographic Names. By Henry Gannett.

Place-Names. **Taylor.**

Names and their Histories alphabetically arranged as a Handbook of Historical Geography and Topographical Nomenclature. By Isaac Taylor, M.A., etc. London: Rivington, Percival & Co., 1896. Size 7½ × 5, pp. viii. and 392. *Price* 6*s.*

A dictionary dealing with the origin of certain selected place-names, and containing some additional matter.

Political Geography—Cables. **Depelley.**

Les cables sous-marins et la Défense de nos Colonies. Conférence faite sous le patronage de l'Union Coloniale Française. Par M. J. Depelley. Paris: L. Chailley, 1896. Size 8½ × 5½, pp. 40. *Map and Diagram.*

The author shows, in a very striking diagram, how exactly the development of the British submarine cable-system has corresponded with the increase of trade between

the colonies and the mother-country. He points out the political bearings of the monopoly of submarine cables being vested in one nation; and gives a map of submarine lines coloured to distinguish British, French, and other cables.

Royal Navy List. **Lean.**

Lean's Royal Navy List. . . . By Lieut.-Colonel Francis Lean. London: Witherby & Co., 1896. Size 9½ × 6, pp. xviii. and 476.

Sixth International Geographical Congress.

Resolutions considered and passed by the Sixth International Geographical Congress, held in London, 1895. Size 10 × 6½, pp. 10.

Sixth International Geographical Congress. **Erödi.**

Jelentés a Londonban tartott hatodik nemzet-Rözi földrajzi congressusról ('Report of the Sixth International Geographical Congress of London'). [Dr. Béla Erödi.] Size 9½ × 6½, pp. [16.]

Sixth International Geographical Congress—Report. ——

Report of the Sixth International Geographical Congress, held in London, 1895. Edited by the Secretaries. London: John Murray, 1896. Size 10 × 6½, pp. xxxvi., 806, 84, and 190. *Maps and Illustrations.*

A note on this volume appeared in the *Journal* for September, p. 290.

Sixth International Geographical Congress. **Campos.**

La Geografía en 1895. Memoria Sobre el VI. Congreso Internacional de Ciencias geográficas celebrado en Lóndres. Por Rafael Torres Campos.—Bol. Soc. Geog. Madrid. Tomo xxxviii. Nos. 1, 2, y 3. 1896. Pp. 48.

Statesman's Year-Book. **Keltie and Renwick.**

The Statesman's Year-Book. Statistical and Historical Annual of the States of the World for the year 1896. Edited by J. Scott Keltie with the assistance of I. P. A. Renwick. [Second Edition.] London: Macmillan & Co., 1896. Size 7½ × 5, pp. xxxii. and 1164. *Maps. Price* 10*s.* 6*d. Presented by the Publishers.*

The Statesman's Year-Book, for, we believe, the first time, has been issued in a second edition on account of the great demand. This year's issue contains a series of excellent political maps bearing on burning questions in South Africa, the Pamirs, and Venezuela.

Tropical Hygiene. *Rev. Scientifique* (4) **6** (1896): 326–335. **Stokvis.**

La colonisation et l'hygiène tropicale. Par M. Stokvis.

Vasco da Gama Celebration. **Soveral.**

The Fourth Centenary of the Sea Route to India. Homage to Dom Vasco da Gama on the Anniversary of the Fourth Centenary of the Discovery of a New Route to India. Presented to the Geographical Society of Lisbon by Vicomte de Soveral. Lisbon: National Printing Office, 1896. Size 10 × 6½, pp. 6.

NEW MAPS.

By J. Coles, *Map Curator*, R.G.S.

ARCTIC REGIONS.

North Pole. **Herrich.**

Neueste Handkarte der Gebiete um den Nordpol. Scale 1 : 20,000,000. Nach zuverlässigen Quellen bearbeitet von A. Herrich. 3 Auflage, Glogau. Verlag von Carl Flemming. *Price* 1 *mark.*

This is a small circumpolar map, on which the routes followed by all the principal Polar expeditions since 1827 are laid down, and is specially interesting as showing the route followed by Dr. Nansen, and also the track of the *Fram.*

EUROPE.

Denmark. **Danish General Staff.**

Generalstabens topografiske Kaart over Danmark. Scale 1 : 40,000 or 1·5 inch to a stat. mile. Kalkograferet og graveret ved Generalstaben Kjobenhavn 1896. Sheets—Lögstär, Thisted, Feggesceind. *Presented by the Danish General Staff, through H.E. the Danish Minister.*

England and Wales. **Ordnance Survey.**

Publications issued since September 7, 1896.

1-inch—General Maps:—

England and Wales:—109, 153, hills photozincographed in brown, 1*s.* each; 100, 218, 235, 348, 351, 352 (revised), engraved in outline, with contours, 1*s.* each.

6-inch—County Maps:—

England and Wales:—**Devonshire** (revision), 117 N.W., S.E., 124 N.W., 130 N.W., N.E., 1*s.* each. **Lancashire (revision)**, 36, 2*s.* **Yorkshire** (revision), 63, 95, 164 W., 2*s.* each; 82, 83, 96, 97, 114, 118, 148, 151, 2*s.* 6*d.* each.

25-inch—Parish Maps:—

England and Wales:—**Durham** (revision), VIII. 1; XIII. 3, 7; XVII. 1, 2, 3, 7, 11, 12, 16; XVIII. 1, 5, 6, 9, 14, 16; XIX. 2, 8, 9, 10, 11, 14, 15; XX. 2, 3, 5, 6, 7, 10; XXV. 2, 3, 4; XXVI. 1, 3*s.* each. **Essex** (revision), XLI. 9; XLIX. 11; LVIII. 7, 10; LIX. 14, 15; LXVI. 16; LXVII. 3, 4, 5, 7, 8, 9, 11, 12, 13; LXVIII. 10, 13, 14, 15; LXXIV. 8; LXXV. 1, 4; LXVI. 1, 2, 3, 3*s.* each. **Hampshire** (revision), XII. 7; XIX. 1; XX. 1, 2, 6, 9, 10, 11, 15; XXVII. 16; XXVIII. 3, 7, 9, 10, 11, 13, 14, 15; XXXI. 16; XXXII. 2; XXXIV. 5, 7, 9, 15, 16; XXXV. 4, 5, 7, 8, 11, 12, 13, 14, 15; XXXVI. 1; XXXIX. 11, 12; XL. 1, 2, 3, 4, 5, 6, 7, 8, 10; XLI. 5, 10, 11; XLII. 1, 2, 4, 8, 11, 12; XLIII. 1, 2, 5; XLIX. 3, 3*s.* each. **Kent** (revision), XVII. 1, 3, 4, 7, 9, 10, 11, 12, 13, 14, 3*s.* each. **Middlesex** (revision), IX. 7, 11, 15, 16; XI. 2, 9, 13; XV. 1, 3, 4, 10, 14, 3*s.* each. **Northumberland** (revision), LXXXII. 12, 16; LXXXIII. 11; LXXXIV. 5, 7, 9, 11, 12, 14, 15; XCI. 4, 5, 7, 11, 12, 15; XCII. 8, 13; XCIII. 2, 10, 14, 15; CI. 1, 2, 3, 4, 5, 6, 7, 9, 10, 12; CII. 2, 4, 5, 8, 12, 15; CIII. 13, 14, 15, 16; CVIII. 3, 3*s.* each. **Surrey** (revision). X. 5; XI. 11; XVI. 14; XX. 12, 15; XXIII. 6, 16; XXIV. 3, 13, 14, 15, 16; XXV. 12, 13, 15, 16; XXVI. 1, 2, 3, 5, 6, 7, 10; XXXI. 1, 4, 5; XXXII. 1, 2, 3, 6, 7, 8; XXXIII. 1, 2, 3, 5, 6, 7, 3*s.* each.

(E. Stanford, Agent.)

England. **Bartholomew.**

New plan of Eastbourne from the Ordnance Survey, by John Bartholomew, F.R.G.S. Scale 295 yards to an inch. W. H. Smith & Son, London, 1896.—New plan of Hastings and St. Leonards from the Ordnance Survey, by John Bartholomew, F.R.G.S. Scale 335 yards to an inch. W. H. Smith & Son, London, 1896. *Price* 1*s. each, on cloth. Presented by Messrs. J. Bartholomew & Co.*

These plans are reductions from the Ordnance Survey, which have been corrected and brought up to date by the local authorities. They are accompanied by explanatory letterpress, and are furnished with indexes.

England. **Bartholomew.**

London Environs. Fifty mile radius. By John Bartholomew, F.R.G.S. Scale 1: 253,440 or 4 stat. miles to an inch. J. Bartholomew & Co., Edinburgh. *Price* 2*s. on cloth. Presented by Messrs. J. Bartholomew & Co.*

The country within a radius of more than 50 miles is included in this map. The approximate distance of any place from the metropolis can be seen at a glance, as concentric circles, 5 miles apart, are drawn from London as a centre.

Germany. **Kgl. Preuss. Landes-Aufnahme.**

Karte des Deutschen Reiches. Scale 1: 100,000 or 1·5 stat. miles to an inch. Herausgegeben von der Kartogr. Abteilung de Kgl. Preuss, Landes-Aufnahme, 1896. Sheets: 248, Friedeberg i. d. Neum; 347, Fraustadt; 353, Wesel; 372, Glogau; 378, Krefeld. *Price* 1·50 *marks each sheet.*

Scotland. **Bartholomew.**

Bartholomew's Reduced Ordnance Survey of Scotland. Sheet 9, Berwick and Haddington. Scale 1: 126,720 or 2 stat. miles to an inch. John Bartholomew & Co., Edinburgh, 1896. *Price* 2*s. on cloth. Presented by Messrs. J. Bartholomew & Co.*

This is a revised edition of Sheet 9 of Bartholomew's reduced Ordnance Survey of Scotland.

ASIA.

Indian Government Surveys. **Surveyor-General's Office, Calcutta.**

Indian Atlas, 4 miles to an inch. Sheets: No. 14, district Peshawur and parts of districts Kohat, Rawal Pindi and Hazara (Punjab), Buneya, Swat, Kabul, and Terah (Afghanistan), additions to 1892; No. 103, parts of districts Azimgurh, Ghazipur and Benares (N.W. Provinces), Tirhoot, Sarun, Patna, Shahabad, and Gya (Bengal), additions to 1895; No. 121, district Howrah, and parts of districts 24 Paganas, Burdwan, Khulna, Nadia, Jessore, Faridpur, Backergunge, Midnapore, and Hooghly (Bengal), with additions to 1895. Quarter-sheets: No. 35 S.E., parts of native states Oodeypore, Jhallawar, Partabgarh and Banswara (Rajputana), and of Gwalior, Indore and Western Malwa Agencies (Central India), with additions to 1891; No. 38 N.W., parts of district Nasik and of Dang, Baroda, Bansda, and

Dharampur States (Bombay Presidency), April, 1896; No. 69 S.W., parts of districts Jhansi, Hamipur (N.W. Provinces), Gwalior, Tehria, and Datia (Native States), C. I. Agency, with additions and corrections to 1891; No. 70 N.E., parts of districts Banda (N.W. Provinces) and Damoh (Central Provinces), of Native States Bijawar, Panna, Pathar, Kachhar, Chhatarpur, Ajaigarh, Jaso, Charkhari, Kothi, Sohawal, Nagode, and Chobe, Bundelkhand (C. I. Agency), additions to 1889; No. 114 N.W., parts of districts Lohardaga, Manbhum, Midnapore, and Singhbhum (Bengal), April, 1896.—Bengal Survey, 1 inch to a mile. Sheet No. 293 (second edition), districts Darjeeling and Jalpaiguri, Seasons 1858–59, 1861–67, 1880–81, and 1889–92. —Bombay Survey, 1 inch to a mile. Sheet No. 309, districts Dharwar and N. Kanara and Native State Savanur (Dharwar Agency), Seasons 1893–94.—Upper Burma Survey, 1 inch to a mile. Sheet No. 312, Southern Shan States, Season 1893–4.—Lower Burma Survey, 1 inch to a mile. Sheets: No. 272, district Toungoo, Seasons 1890–91 and 1892–93; No. 273, district Toungoo, Seasons 1890–91–92; No. 419, district Thaton, Season 1893–95; No. 423, district Amherst and Thaton, Seasons 1890–95.—North-Eastern Frontier Survey, 1 inch to 4 miles. Parts of Northern Shan States, Season 1894–95.—Gujarat, 16 miles to an inch, April, 1896.—Upper Burma, 16 miles to an inch. Second edition, 1894, with corrections to boundaries up to October, 1895, 2 sheets.—District Noakhali, Lower Provinces (Bengal), 5 miles to an inch, with additions and corrections to boundaries and roads to February, 1896.—District Hazaribagh, Lower Provinces, Bengal, 5 miles to an inch, with additions and corrections to roads up to April, 1896.—District Nowgong, Assam, 5 miles to an inch, additions and corrections to November, 1893.—District Raipur, 5 miles to an inch, Seasons 1862–64 and 1866–72, additions to March, 1892, 2 sheets. —District Mirzapur, 16 miles to an inch, February, 1896, 6 sheets.—District Mizapur (N.W. Provinces of Oudh), 12 miles to an inch, 1896.—District Garhwal (N.W. Provinces and Oudh), 12 miles to an inch, 1896.—District Meerut (N.W. Provinces and Oudh), 8 miles to an inch, 1896.—District Moradabad (N.W. Provinces and Oudh), 8 miles to an inch, 1896.—District Muttra (N.W. Provinces and Oudh), 8 miles to an inch, 1896.—District Muzaffarnagar (N.W. Provinces and Oudh), 8 miles to an inch, 1896.—District Partabgarh (N.W. Provinces and Oudh), 8 miles to an inch, 1896.—District Shahjahanpur (N.W. Provinces and Oudh), 8 miles to an inch, 1896.—District Backergunge (Bengal), 8 miles to an inch, 1890.—District Bogra (Bengal), 8 miles to an inch, 1890.—District Purnea (Bengal), 8 miles to an inch, 1889.—District Rajshahi (Bengal), 8 miles to an inch, 1890.—Map of Sundarbans (Bengal), 16 miles to an inch, 1890.—Central Province Survey, Index to the Forest Surveys in District Sambalpur; No. 14 party, November, 1895.—Index to the Forest Surveys in district Bilaspur; No. 14 party, November, 1895. *Presented by H.M. Secretary of State for India, through India Office.*

AFRICA.

Swaziland. **Miller.**

Sketch-Map of Swaziland made for the Umbandine Swaziland Concessions Syndicate, Ltd. By Allister M. Miller. Scale 1: 190,000 or 3 stat. miles to an inch. London: published by Edward Stanford, 1896. *Presented by the Publisher.*

In the absence of any regular survey of this part of South Africa, this will be of service to persons visiting the country. Means of communication are laid down, and a good general idea of the physical features is given. All land lower than 1500 feet above sea-level is coloured green, and the positions of native kraals, approximate elevations, and nature of the forests are indicated by symbols.

Tunis. **Babelon, Cagnat, and Reinach.**

Atlas Archéologique de la Tunisie. Edition spéciale des cartes topographiques publiées par le Ministère de la Guerre, accompagnée d'un Texte Explicatif par MM. E. Babelon, R. Cagnat, S. Reinach, membres de la Commission de l'Afrique du Nord. Description de l'Afrique du Nord entreprise, par ordre de M. le Ministre de l'Instruction Publique et des Beaux-Arts. Parts iii. and iv. Paris: Ernest Leroux, 1895–96.

This atlas is being compiled under the direction of the Minister of Public Instruction and Fine Arts. It is composed of the sheets of the large-scale government survey of Tunis, on which archæological information is given. It is accompanied by letterpress, written by MM. E. Babelon, R. Cagnat, and S. Reinach.

West Africa. **Marchand.**

Mission Marchand, le Transnigérien, le Bandama et le Bagoé. Carte levée et dressée de 1892 à 1895. Par le Capitaine Marchand. Scale 1: 500,000 or 8

stat. miles to an inch. 2 sheets and letterpress. Service Géographique des Colonies, Paris, 1896. *Presented by the Service Géographique des Colonies.*

This map is based on the results obtained by Captain Marchand during his third journey in the vicinity of the great bend of the Niger, the surrounding country having been taken from Captain Binger's map of 1892. In addition to this, the itineraries of other travellers have been used, while some of the country has been sketched in from native report. The lines of railway which it is proposed to construct are laid down, and the position of all military posts and the limits of forests are shown. The map is accompanied by an index of names and explanatory letterpress.

West Africa. **Pobéguin.**

Carte de la Côte d'Ivoire (Région Côtière de Fresco au Cavally). Levée et dressée par H. Pobéguin, Administrateur Colonial, par ordre de M. le Gouverneur Binger, 1895–96. Scale 1 : 150,000 or 2·3 stat. miles to an inch. Sheets: Cavally, Grabo—Haut San Pedro, Kremoue—Kouati, Doboue—Sassandra, Fresco—Haut Sassandra, Daguire—San Pedro, Drewin—Tabou, Béréby—Cap des Palmes, Cavally. Ministère des Colonies. Paris, 1896. *With Index. Presented by the Service Géographique des Colonies, Paris.*

These sheets complete the map of the Ivory Coast, which embraces the country between the Cavally river on the west and the Bandama on the east. It contains a large amount of detail, and is accompanied by an index sheet.

AMERICA.

United States. **U.S. Geological Survey.**

Geologic Atlas of the United States. Scale 1 : 125,000 or 2 stat. miles to an inch, and 1 : 250,000 or 4 stat. miles to an inch. Folios: Stevenson (Alabama, Georgia, Tennessee); Lassen Peak, Smartsville, Marysville (California); Pike's Peak (Colorado); Nomini (Maryland, Virginia); Three Forks (Montana); Cleveland, Pikeville, McMinnville, London (Tennessee); Knoxville (Tennessee, North Carolina); Fredericksburg (Virginia, Maryland); Staunton (Virginia, West Virginia). Department of the Interior, United States Geological Survey; J. W. Powell, Director. Washington, D.C. *Presented by the U.S. Geological Survey.*

Venezuela. **Sievers.**

Nördliches Venezuela. II. Hohenschichten, Hydrographie, Orte u. Verkehrswege. Scale 1 : 3,000,000 or 47·3 stat. miles to an inch. Von W. Sievers. Petermann's 'Geographische Mitteilungen,' Jahrgang 1896, Tafel II. Gotha: Justus Perthes. *Presented by the Publisher.*

AUSTRALIA.

Western Australia. **Stanford.**

The Western Australia Goldfields. Scale 1 : 1,647,360 or 26 stat. miles to an inch. Edward Stanford. London, 1896. *Presented by the Publisher.*

On this map the positions of all the principal goldfields of Western Australia are indicated, but, in addition to this, it is a good map of the south-west portion of the colony, on which all railways, roads, and explorers' routes are laid down.

World. **Bartholomew.**

Handy Reference Atlas of the World. Edited by J. G. Bartholomew, F.R.S.E., F.R.G.S. Fifth edition, with complete index and geographical statistics, 1896. London: John Walker & Co., Ltd. *Prices 7s. 6d. and 10s. 6d. Presented by the Publishers.*

This atlas has now reached its fifth edition. It has been revised, and several new maps have been added. Being of octavo size, it will be found very handy for reference when reading a newspaper or book.

PHOTOGRAPHS.

Malay Peninsula.

Four photographs of the Sakai natives of the Malay Peninsula, taken in 1894–95. *Presented by George C. Morant, Esq.*

These photographs will be chiefly interesting to anthropologists. They were taken for Mr. George C. Morant, 1894–95.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

MAP OF
CENTRAL SIAM
To illustrate the paper
By J.B. Black
of Her Majesty's Consular Service
English Miles
0 10 20 30 40 50 60
Author's route
99°
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101°
102°
103°
104°
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19°
18°
17°
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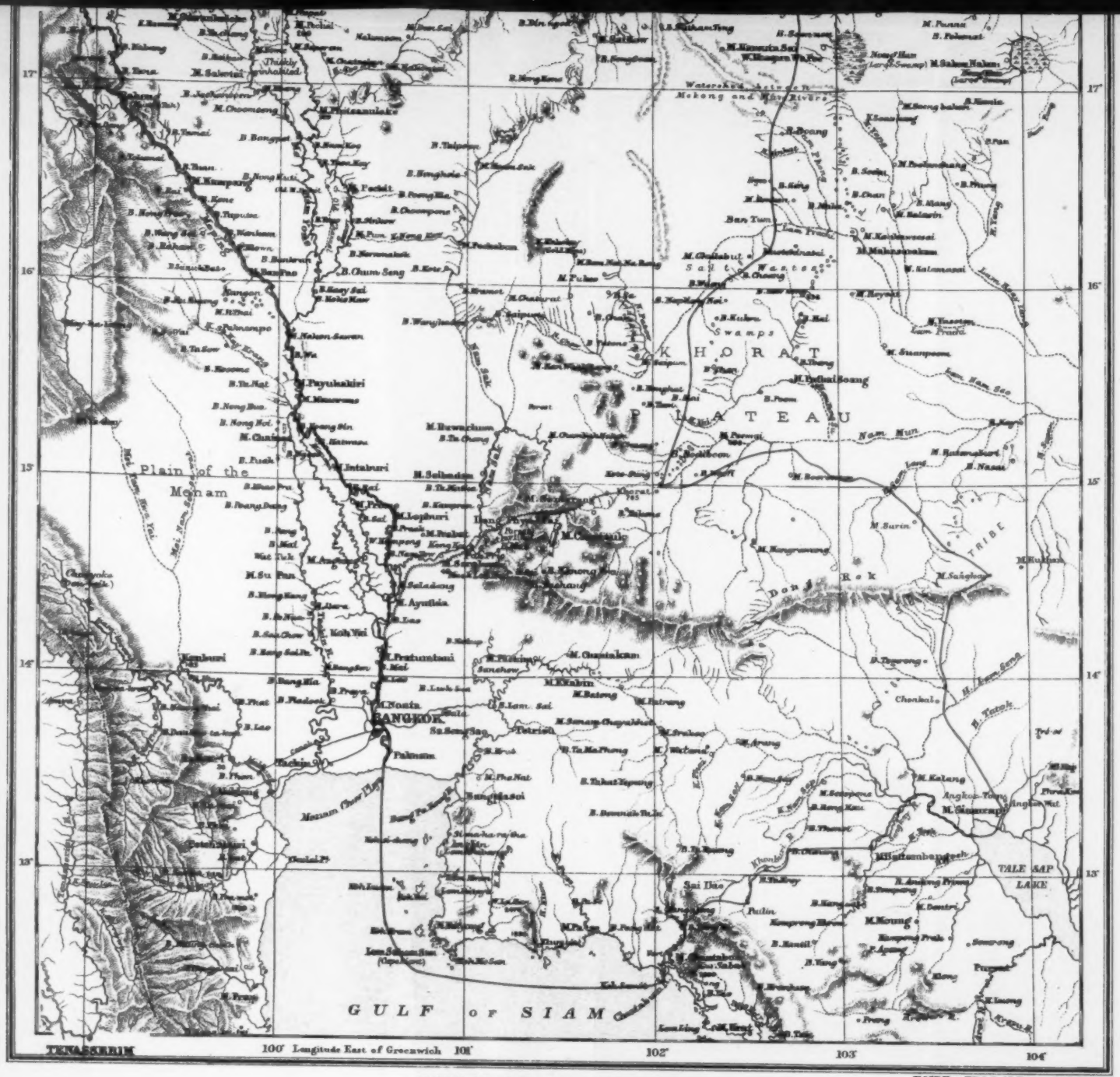

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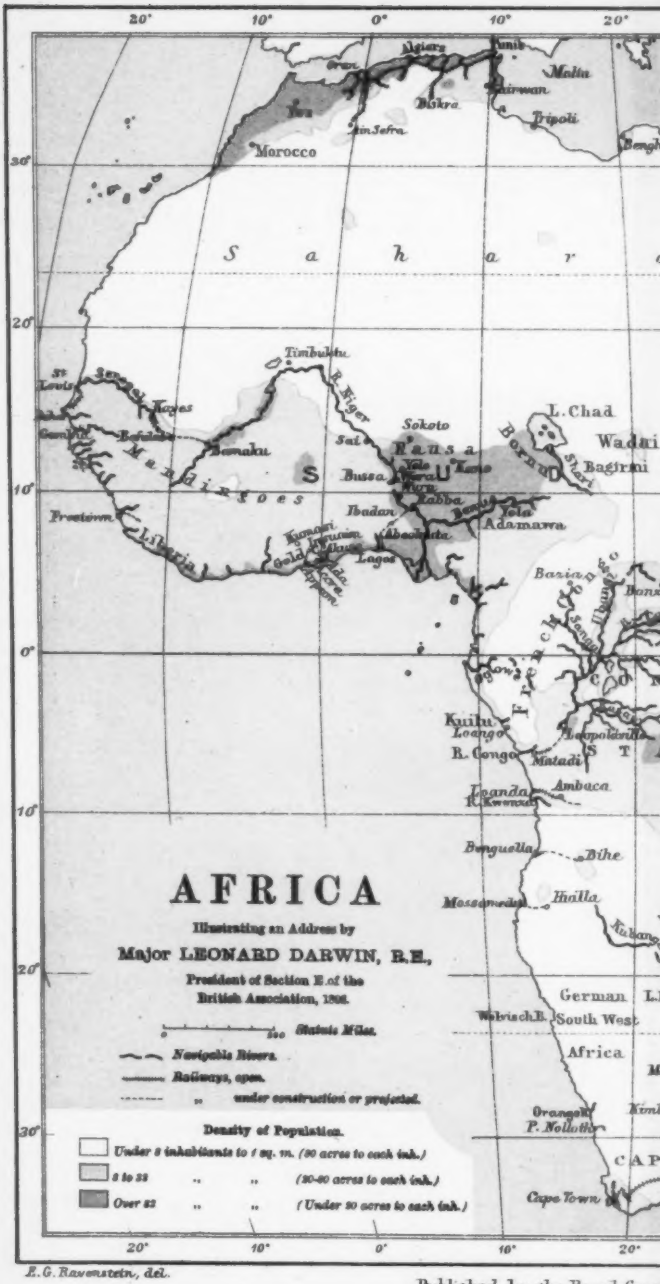

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